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Steady-State Pressure Losses for Multirod Burst Test (MRBT) Bundle B-5

R. T. Bailey

Prepared for the U.S. Nuclear Regulatory Commission
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STEADY-STATE PRESSURE LOSSES FOR MULTIROD BURST TEST (MRBT) BUNDLE B-5

R. T. Bailey

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OAK RIDGE NATIONAL LABORATORY
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Engineering Technology Division
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FOREWORD

This report describes the water-flow-test of a 64-rod PWR fuel assembly simulation which was tested under loss-of-coolant-accident (LOCA) conditions at the Oak Ridge National Laboratory. The test, involving cladding deformation and rupture in the temperature region of the Zircaloy alpha phase, was performed at ORNL on May 30, 1980. The average of burst temperatures and pressure differentials were 773°C and 8,806 kPa. In addition to this report the details of the B-5 test assembly, test conditions, and posttest examination thus far can be found in the following reports.

1. R. H. Chapman et al., Quick-look Report on MRBT B-5 (8 x 8) Bundle Test, Internal Report ORNL/MRBT-5 (July 1980).
2. R. H. Chapman et al., Multirod Burst Test Program Prog. Rep. January-June 1980, NUREG/CR-1883 (ORNL/NUREG/TM-426).
3. A. W. Longest, Multirod Burst Test Program Prog. Rep. January-June 1981, NUREG/CR-2366, Vol. 1, ORNL/TM-8058.
4. J. L. Crowley, Multirod Burst Test Program Prog. Rep. July-December 1981, NUREG/CR-2366 Vol. 2, ORNL/TM-8190.

This report describes the work performed by the Babcock and Wilcox Company in characterizing the hydraulic resistance of the B-5 bundle. In addition to the flow test of the deformed bundle, B&W assembled and flow tested an undeformed reference bundle (designated as B-5R) to provide comparative data. Magnetic tapes containing the raw test data, reduced test data, and calibration records of the B&W flow tests are on file at ORNL.

A note of caution is made to any who may use this report in conjuction with the ORNL reports on B-5. Please note that grid identification by B&W and ORNL do not correspond.

Grid identifications

ORNL	B&W
#3	#4
#2	#3
#1	#2
#4	#1

In the near future ORNL will prepare a comprehensive B-5 data report which will include all aspects of the test.

J. L. Crowley, Technical Manager for Subcontract 40X-40441C
Multirod Burst Test Program
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Oak Ridge National Laboratory

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STEADY-STATE PRESSURE LOSSES FOR MULTIROD BURST TEST (MRBT) BUNDLE B-5

by

R. T. Bailey

PROJECT SUMMARY

Purpose

The Oak Ridge National Laboratory (ORNL) has undertaken the Multirod Burst Test (MRBT) Program sponsored by the Nuclear Regulatory Commission. The purpose of the MRBT program is to characterize the deformation behavior of unirradiated fuel cladding under simulated light water reactor accident conditions. One of the objectives of the MRBT program is to establish hydraulic characteristics of multirod burst bundles as a function of rod deformation.

ORNL contracted with The Babcock & Wilcox Company (B&W) to perform flow testing necessary to characterize the hydraulic resistance of the MRBT bundle designated as B-5. Additionally, a reference bundle (designated B-5R) which simulated B-5 in an undeformed -- or pre-burst -- geometry was flow tested to provide comparative data.

Summary of Work

The B-5 and B-5R bundles were 8 x 8-rod arrays with a nominal rod diameter and rod-to-rod pitch corresponding to B&W's 15 x 15 fuel assembly geometry. Each bundle was tested at five different flow rates. Each flow test was performed twice in order to assess repeatability. Static pressures were measured at 480 points distributed at 40 locations along the length and 12 locations around the perimeter of the bundles.

The data were analysed to determine axial pressure loss profiles, friction factors, spacer grid loss coefficients and overall bundle loss coefficients. Data from this test were compared to results of previous MRBT hydraulic testing*.

* Mincey, J. F., "Steady-State Axial Pressure Losses Along the Exterior of Deformed Fuel Cladding: Multirod Burst Test (MRBT) Bundles B-1 and B-2," NUREG/CR-1011, ORNL/NUREG/TM-350, Oak Ridge National Laboratory, January 1980.

Results

For the same flow rate, the overall bundle pressure loss for the B-5 bundle was about a factor of four greater than for B-5R. The shape of the axial pressure loss profile for the B-5 bundle showed regions of high and low flow blockage that were in agreement with the observed distribution of rod deformations.

The data for the two bundles showed an overall pressure loss repeatability within 5% with an average of about 2%.

For the B-5R bundle, the range of spacer grid loss coefficients and friction factors were in agreement with those determined for hydraulically similar bundle tests*.

Conclusions and Recommendations

The pressure loss data presented in this report characterize in detail the hydraulic resistance of MRBT bundle B-5. The magnitude of the overall pressure loss for the B-5 bundle shows that the flow area reduction is substantially larger than for the B-1 and B-2 bundles. The shape of the axial pressure loss profile indicates regions of flow area reduction that are essentially coplanar.

The data for the B-5 bundle should be compared to the predictions of an applicable subchannel hydraulics computer program (e.g. COBRA-IV). This comparison should include not only the axial pressure loss profiles, but should also include the magnitude and variation of lateral pressure gradients which are indicative of fluid crossflow and the distribution of flow in the B-5 bundle.

* Mincey, op cit.

ILLUSTRATIONS

Figure		Page
2-1	Cross-Sectional Views of the Flow Housing	2-1
2-2	Average Axial Pressure Loss Profiles for the B-5 and B-5R Bundles	2-2
2-3	Axial Location of Pressure Loss Peaks and Valleys Indicated on a West Side View of the B-5 Bundle	2-4
2-4	Average Axial Pressure Loss Profiles on Each of the Four Sides of the B-5 Bundle	2-5
2-5	Axial Pressure Loss Profiles on the North Side of the B-5 Bundle	2-5
2-6	Top View of Flow Housing Cross-Section Showing Pressure Tap Numbering Scheme and the B-5 Bundle Orientation	2-6
2-7	Axial Pressure Loss Profiles on the East Side of the B-5 Bundle	2-6
2-8	Axial Pressure Loss Profiles on the South Side of the B-5 Bundle	2-7
2-9	Axial Pressure Loss Profiles on the West Side of the B-5 Bundle	2-7
2-10	South Side View of the B-5 Bundle Showing a Clad Rupture and the Relative Location of Adjacent Pressure Taps	2-8
2-11	Normalized Axial Pressure Loss Profiles for the B-5 Bundle at the Highest and Lowest Flow Rates	2-9
2-12	Overall Bundle Loss Coefficient as a Function of Reynolds Number for the B-5 and B-5R Bundles	2-10
2-13	Friction Factor (4f) and Spacer Grid Loss Coefficients (Kg) as a Function of Reynolds Number for the B-5R Bundle	2-11

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CONTENTS

Section		Page
	ABSTRACT	1
1	INTRODUCTION	1-1
2	RESULTS	2-1
	2.1 Pressure Loss Profiles	2-1
	2.2 Loss Coefficients and Friction Factors	2-9
3	DISCUSSION	3-1
4	CONCLUSIONS AND RECOMMENDATIONS	4-1

Appendix A - APPARATUS AND PROCEDURE

Appendix B - DATA REDUCTION AND ERROR ANALYSIS

Appendix C - PRESSURE LOSS DATA - TABULATIONS AND PLOTS

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STEADY-STATE PRESSURE LOSSES FOR MULTIROD BURST TEST (MRBT) BUNDLE B-5

ABSTRACT

The Oak Ridge National Laboratory (ORNL) has undertaken the Multirod Burst Test (MRBT) program for the purpose of characterizing the deformation behavior of unirradiated fuel cladding. As part of this program, ORNL contracted with The Babcock & Wilcox Company (B&W) to obtain experimental hydraulic data for one of the MRBT bundles. This report presents the data that describe the pressure loss characteristics of Multirod Burst Test Bundle "B-5" and a reference or pre-burst geometry bundle. The 8 x 8-rod bundles were flow tested at Reynolds numbers between 17,700 and 177,000. For each of the five test flow rates, the static pressures at 480 points on the perimeter of the bundles were measured. The total pressure loss for the B-5 bundle showed about a fourfold increase over that for the reference geometry bundle. The shape of the axial pressure loss profile for the B-5 bundle agreed with the observed distribution of the clad deformations. The experimental data presented in this report will be used as one of essential inputs to the continuing analytical work at ORNL.

1. INTRODUCTION

The Oak Ridge National Laboratory (ORNL) has previously characterized the hydraulic resistance of Multirod Burst Test (MRBT) bundles B-1 and B-2 and a reference geometry bundle*. After hydraulic testing was completed, the B-1 and B-2 bundles were sectioned and examined to determine the distribution of rod deformation. This information along with the hydraulic test conditions were used with the COBRA-IV computer program to obtain predictions of pressure loss. The predicted pressure losses were then compared to the experimental measurements.

The objective of this test was to provide data that characterize the hydraulic resistance of MRBT bundle B-5 and also provide experimental measurements suitable for detailed comparisons to analytic predictions. The B-5R bundle was tested to provide baseline data, which also provided a means of assessing the accuracy of the measurements. The determination of rod deformation distribution (e.g. flow blockage) in the B-5 bundle and the comparison of B-5 bundle data to analytical predictions is beyond the scope of this project and will be carried out by ORNL.

This test program was performed in accordance with a formal Quality Assurance Program. The Quality Assurance Program conforms to the standards required by the Nuclear Power Generation Division (NPGD) of The Babcock & Wilcox Company (B&W). The records pertaining to the Quality Assurance of this project will be retained by B&W for a minimum of 40 years.

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* Mincey, J. F., "Steady-State Axial Pressure Losses Along the Exterior of Deformed Fuel Cladding: Multirod Burst Test (MRBT) Bundles B-1 and B-2," NUREG/CR-1011, ORNL/NUREG/TM-350, Oak Ridge National Laboratory, January 1980.

2. RESULTS

2.1 PRESSURE LOSS PROFILES

Static pressures were measured using taps located in the walls of the flow housing as shown in Figure 2-1. In addition to providing axial pressure distributions, the pressure tap arrangement also provided the pressure distribution around the perimeter of the bundles at an axial location.

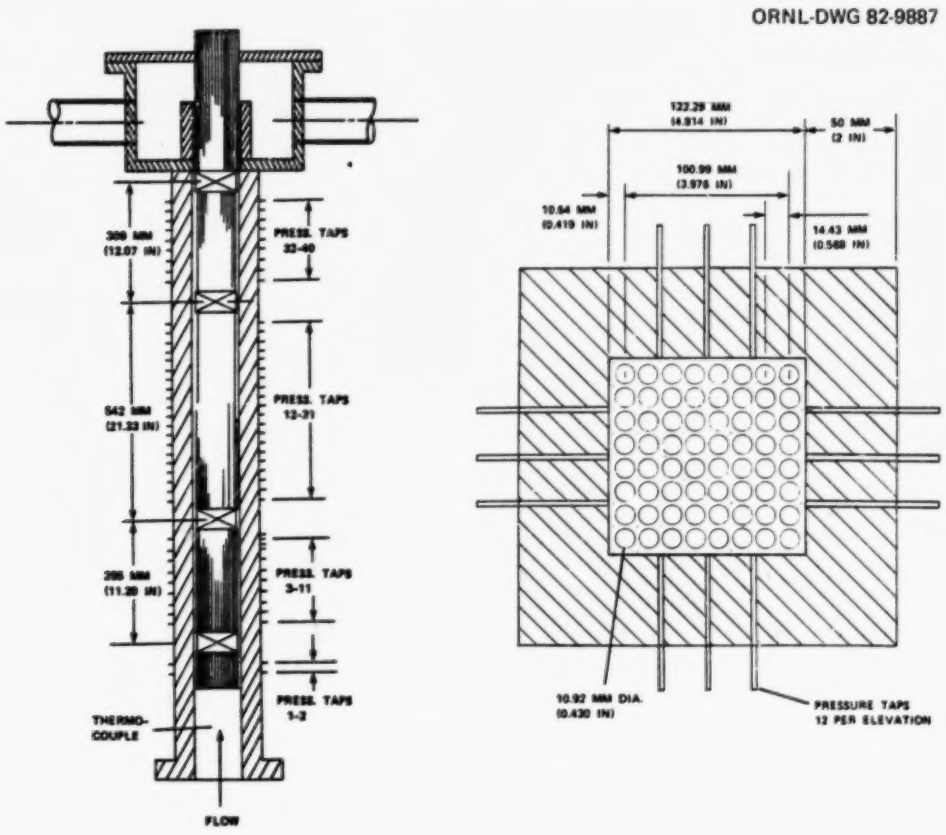

FIGURE 2-1 CROSS-SECTIONAL VIEWS OF THE FLOW HOUSING

Average axial pressure loss profiles for the B-5 and B-5R bundles at a flow rate of 0.0207 m^3/sec (0.731 ft^3/sec) are shown in Figure 2-2. This data is the average of the 12 measured pressures at each axial location. The data for the B-5R bundle in Figure 2-2 behaves as expected. The pressure loss increases monatonically with distance along the bundle, with a step change in pressure across the spacer grids.

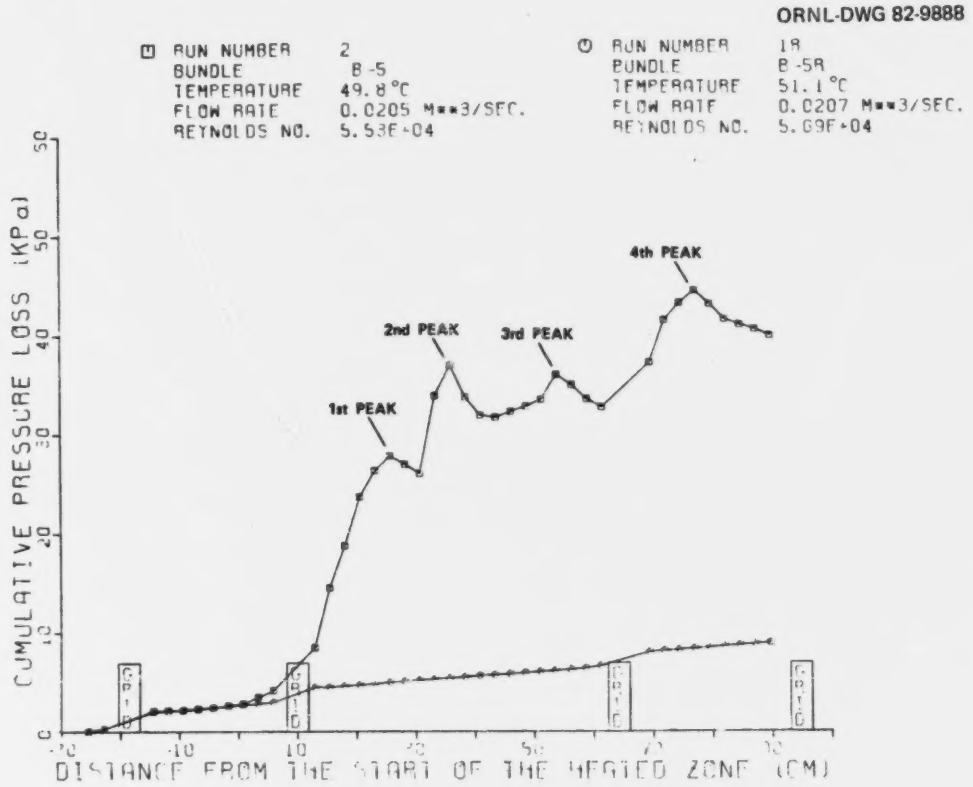

FIGURE 2-2 AVERAGE AXIAL PRESSURE LOSS PROFILES FOR THE B-5 AND B-5R BUNDLES

The pressure loss profile for the B-5 bundle is radically different than that for B-5R. In the undeformed region of the B-5 bundle below the start of the heated zone, the data for the two bundles is indistinguishable. Above the start of the heated zone, pressure loss for the B-5 bundle is substantially larger because of rod swelling and deformation. The sawtooth-shaped pressure loss

profile above 10 cm in Figure 2-2 is due to alternate acceleration and deceleration of fluid as it moves through regions of restricted flow area. The regions of flow area restriction can be seen in Figure 2-3, which shows the north side of the B-5 bundle above the second spacer grid. Indicated in Figure 2-3 are the axial locations of the peaks and valleys of the pressure profile shown in Figure 2-2. As shown, the peaks and valleys correspond to regions of "high" and "low" rod deformation.

Figure 2-4 shows the average pressure loss profiles for each of the four sides of the B-5 bundle. As with Figure 2-2, this data is from Run 2, and each data point is the average of the three pressures on one side of the flow housing. The pressure loss profiles for each of the four sides of the bundle show the same trends but indicate regions of substantial lateral pressure gradients.

Figure 2-5 is the axial pressure loss profiles for the three pressure taps on the north side of the bundle. The pressure tap numbering scheme is shown in Figure 2-6. Figures 2-7, 2-8, and 2-9 are similar plots for the east, south and west sides of the B-5 bundle. With the exception of Figure 2-8 (Taps 7, 8 and 9, south side), the data for the three pressure taps on each wall have nearly the same magnitude over the entire length of the bundle. The lateral variation in pressures along one side of the bundle is generally smaller than the side-to-side variation in pressures shown in Figure 2-4. In Figure 2-8, the large lateral variation in pressure and the step increase in pressure loss was caused by a rod burst and swelling that essentially blocked the wall subchannels adjacent to tap locations 7 and 8. This region of the bundle can be clearly seen in Figure 2-10, which shows the south side of the B-5 bundle.

The shape of the axial pressure profiles shown in the previous figures are typical of all flow rates tested. Bundle average pressure profiles for the highest and lowest flows tested are shown in Figure 2-11. The data for each test is normalized to the total bundle pressure loss for that test, so that any variation in profile shapes are accentuated. The normalized profiles are in good agreement over the entire length of the bundle. Differences in magnitude occur at regions of fluid acceleration (reduced flow area), with the high flow rate data exceeding the low flow rate data.

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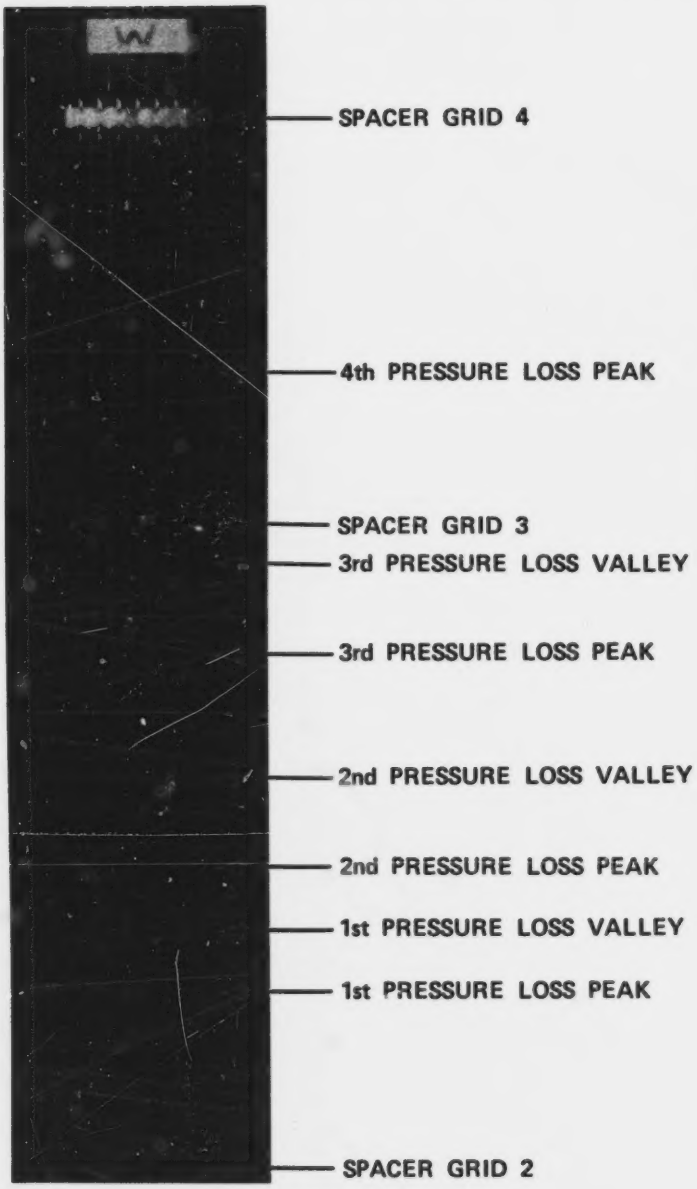

FIGURE 2-3 AXIAL LOCATION OF PRESSURE LOSS PEAKS AND VALLEYS INDICATED ON A WEST SIDE VIEW OF THE B-5 BUNDLE

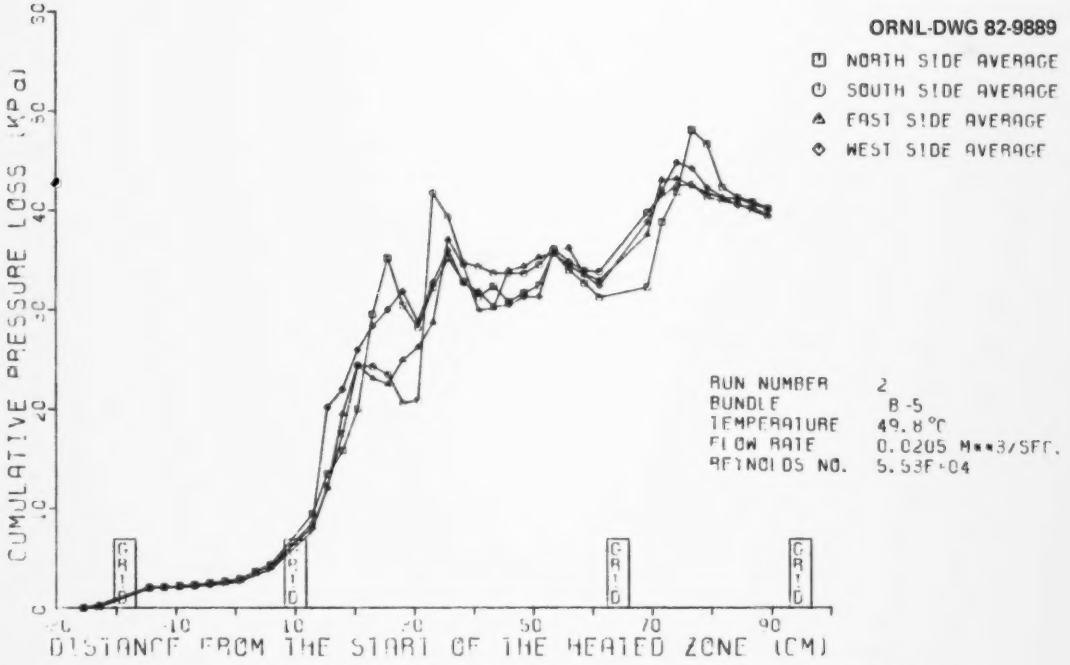

FIGURE 2-4 AVERAGE AXIAL PRESSURE LOSS PROFILES ON EACH OF THE FOUR SIDES OF THE B-5 BUNDLE

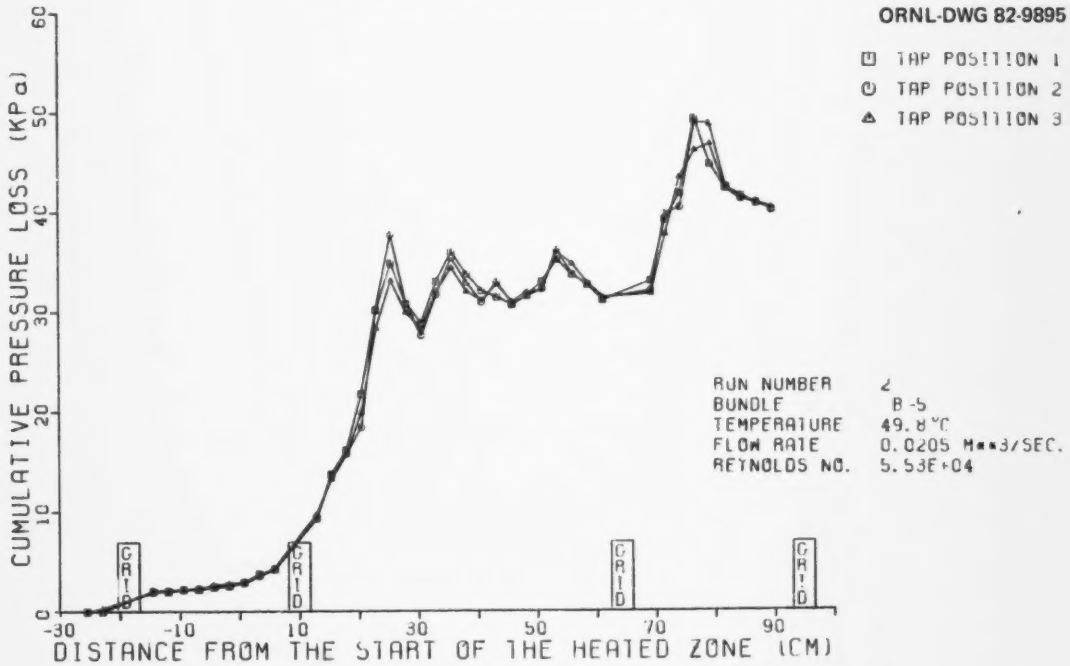

FIGURE 2-5 AXIAL PRESSURE LOSS PROFILES ON THE NORTH SIDE OF THE B-5 BUNDLE

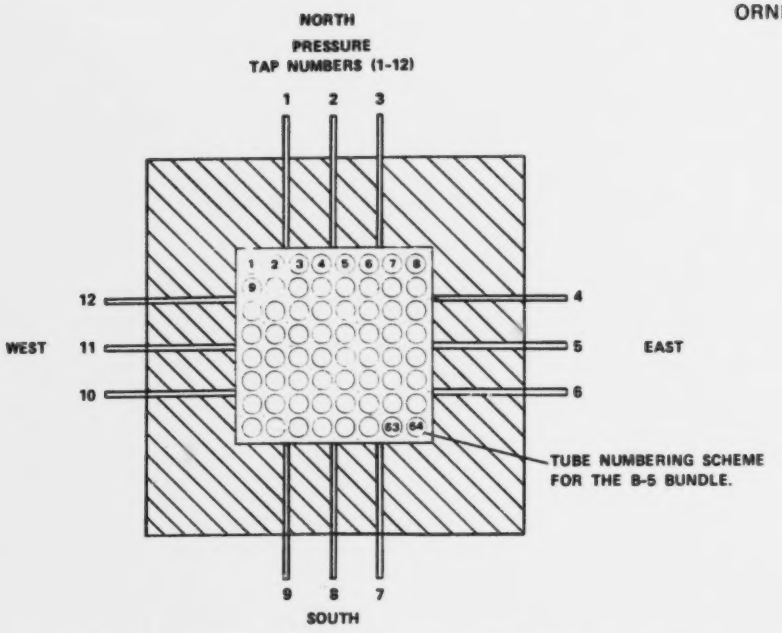

FIGURE 2-6 TOP VIEW OF FLOW HOUSING CROSS-SECTION SHOWING PRESSURE TAP NUMBERING SCHEME AND THE B-5 BUNDLE ORIENTATION

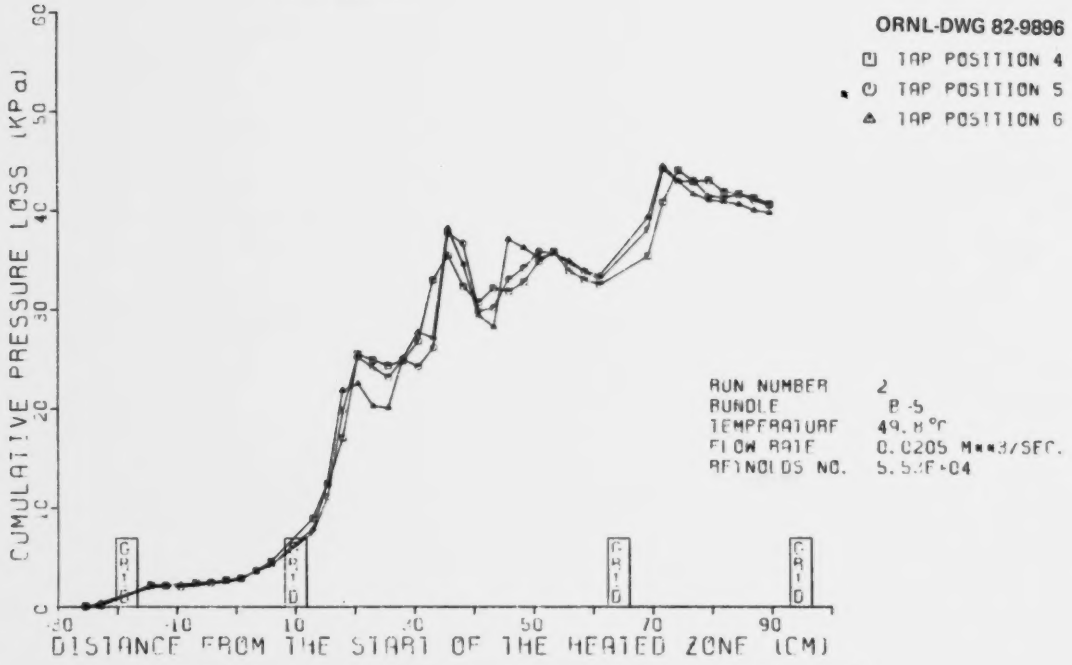

FIGURE 2-7 AXIAL PRESSURE LOSS PROFILES ON THE EAST SIDE OF THE B-5 BUNDLE

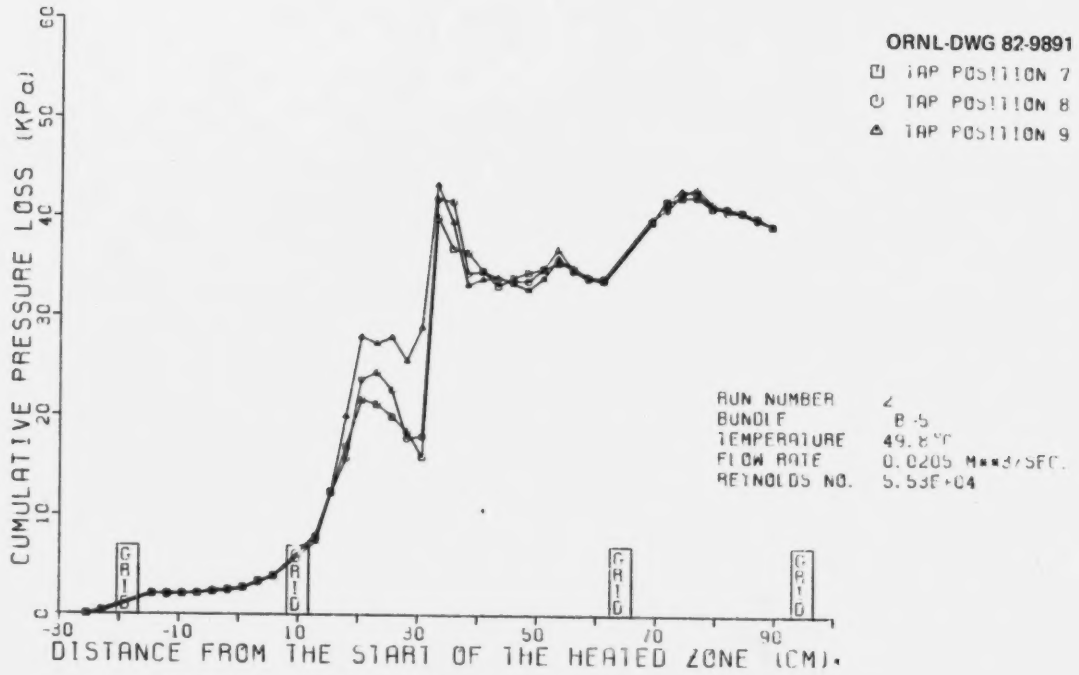

FIGURE 2-8 AXIAL PRESSURE LOSS PROFILES ON THE SOUTH SIDE OF THE B-5 BUNDLE

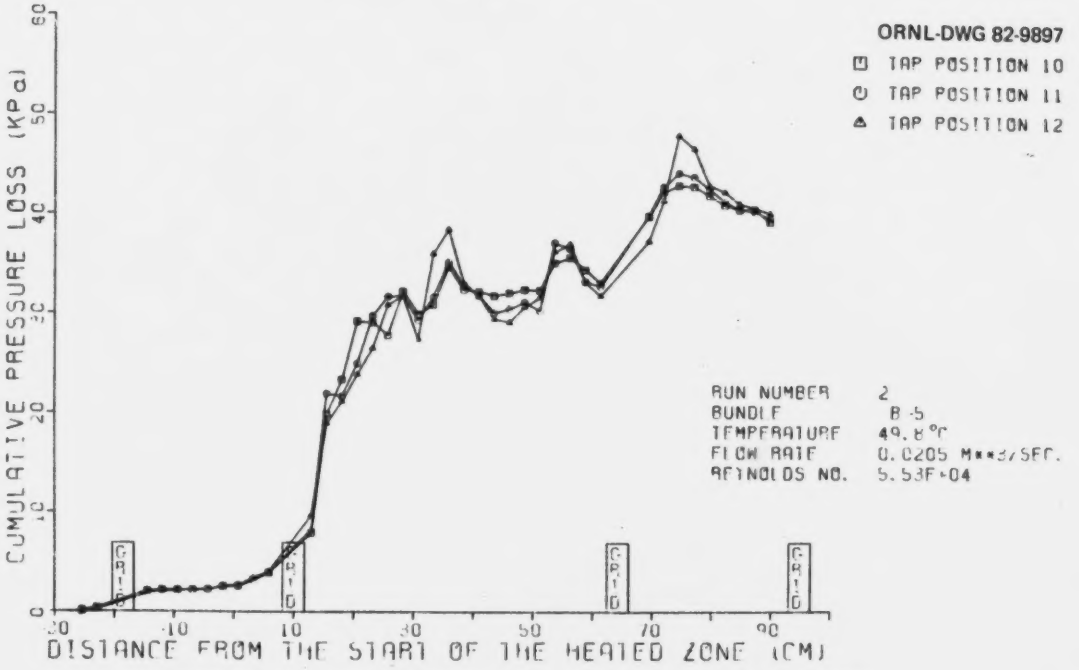

FIGURE 2-9 AXIAL PRESSURE LOSS PROFILES ON THE WEST SIDE OF THE B-5 BUNDLE

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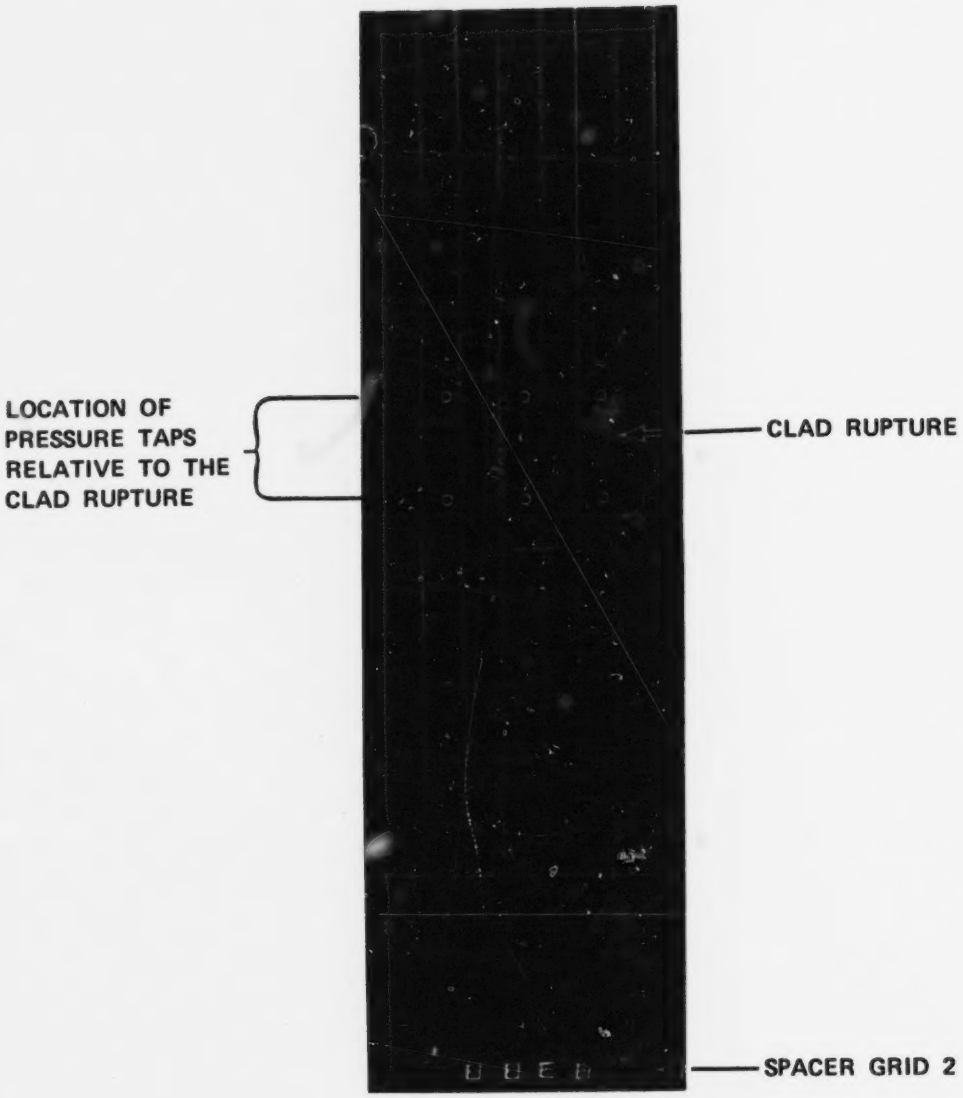


FIGURE 2-10 SOUTH SIDE VIEW OF THE B-5 BUNDLE SHOWING A CLAD RUPTURE AND THE RELATIVE LOCATION OF ADJACENT PRESSURE TAPS

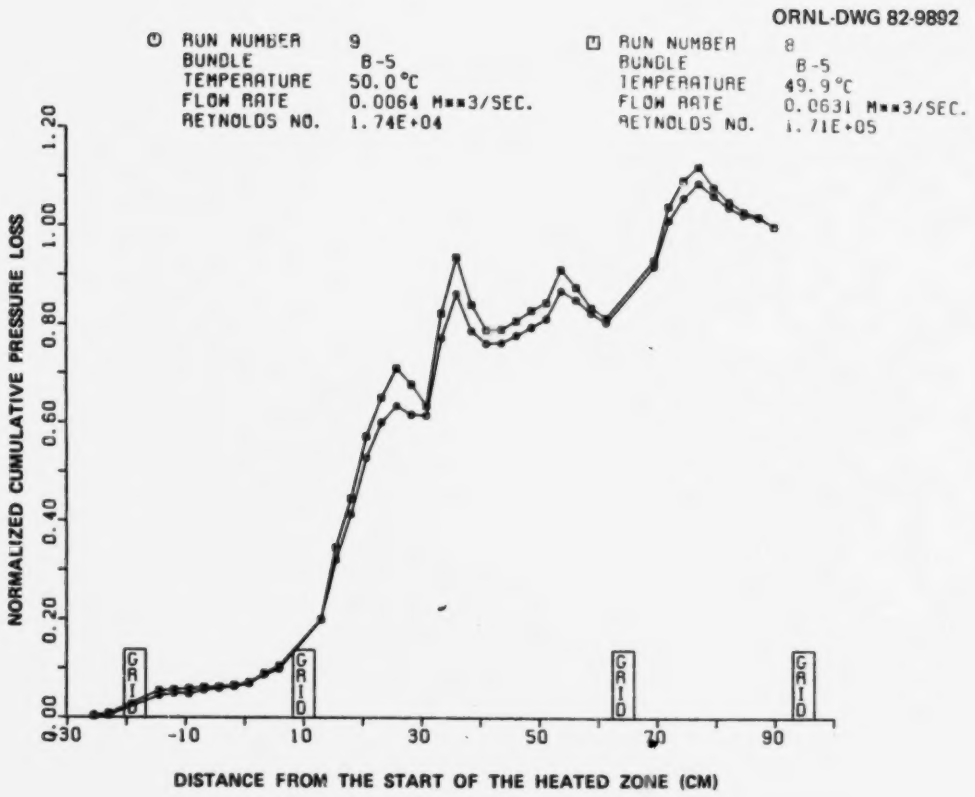


FIGURE 2-11 NORMALIZED AXIAL PRESSURE LOSS PROFILES FOR THE B-5 BUNDLE AT THE HIGHEST AND LOWEST FLOW RATES

2.2 LOSS COEFFICIENTS AND FRICTION FACTORS

Overall loss coefficients for the B-5 and B-5R bundles and friction factor and grid loss coefficients for the B-5R bundle were determined as a function of Reynolds number. The flow area and average hydraulic diameter used in this analysis are based on nominal dimensions for the B-5R bundle and flow housing. Details of the calculation and tabulated data are given in Appendix B.

The overall loss coefficients for the B-5 and B-5R bundles are shown in Figure 2-12. All repeat data are shown in Figure 2-12, which indicates very good repeatability over the entire range of Reynolds number. The loss coefficient for the B-5 bundle is about a factor of four larger than for B-5R, and this is due to large amount of rod deformation in B-5.

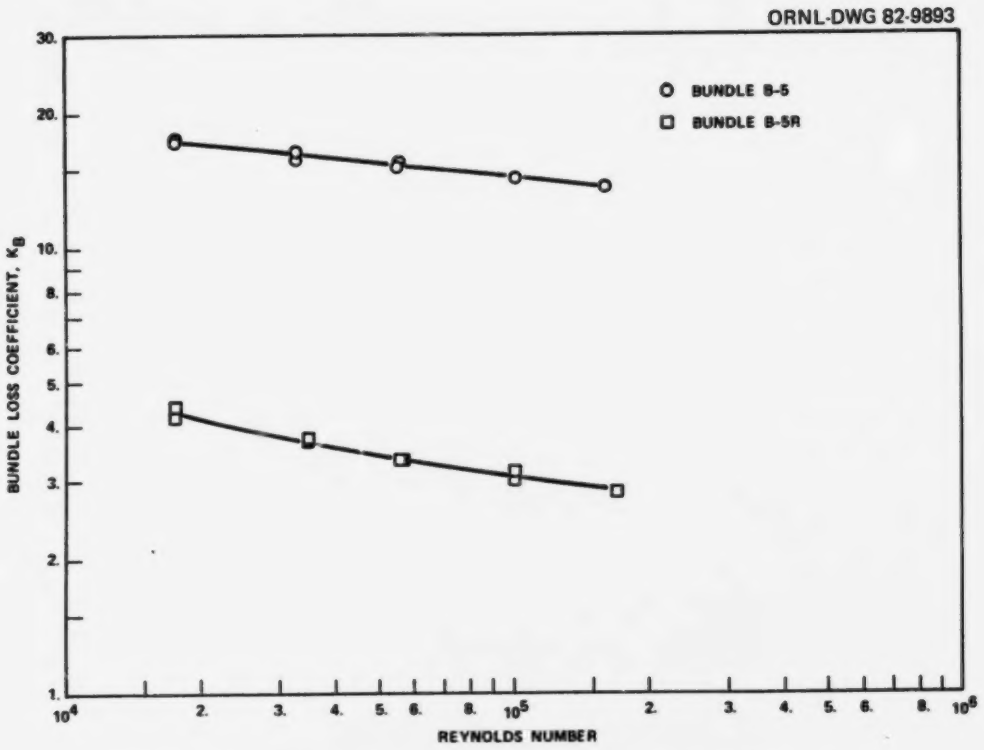
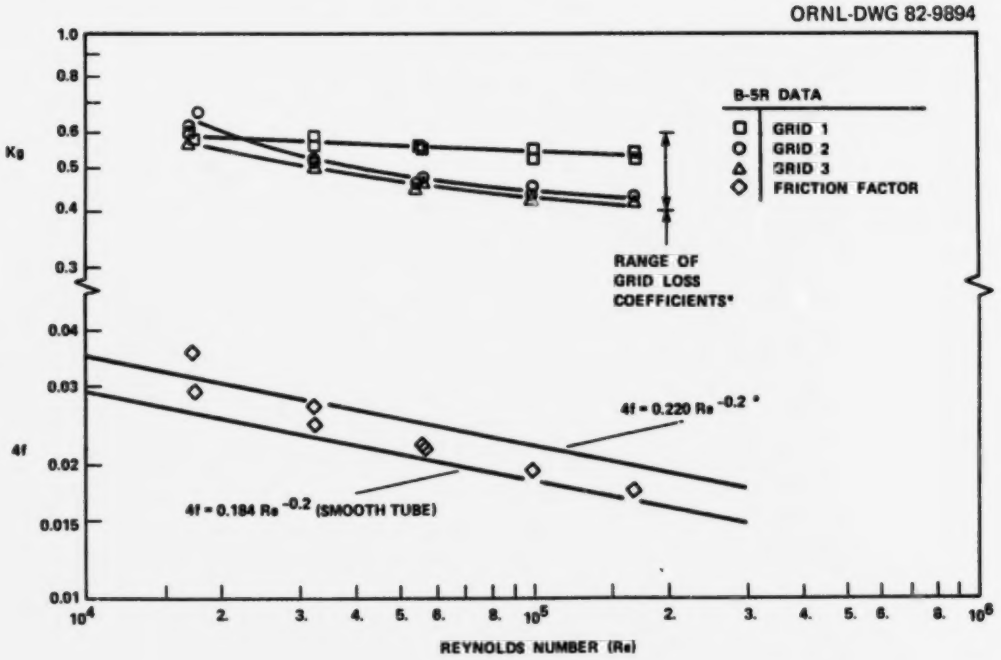


FIGURE 2-12 OVERALL BUNDLE LOSS COEFFICIENT AS A FUNCTION OF REYNOLDS NUMBER FOR THE B-5 AND B-5R BUNDLES

Figure 2-13 shows spacer grid loss coefficients and friction factors as a function of Reynolds number for the B-5R bundle. The spacer grids are numbered sequentially, starting at the bottom of the bundle. As with the overall loss coefficients shown in Figure 2-12, the spacer grid data show good repeatability. The difference in magnitude and Reynolds number dependence of Spacer Grid 1 data, compared to grids 2 and 3, is probably due to incomplete hydraulic development at the bundle inlet. Shown adjacent to the spacer grid data in Figure 2-13 is the range of loss coefficients determined from hydraulic tests of the B-1 and B-2 reference bundle.

The friction factor data for the B-5R bundle is also shown in Figure 2-13. The solid lines above and below the data are a single correlation form with different coefficients. The line falling below the data (coefficient of 0.184) is the standard smooth tube correlation for Reynolds numbers greater than 30,000.

The correlation above the data was used in the analysis of the B-1 and B-2 reference bundle data. On the average, the correlation overpredicts this data by about 8%. However, the correlation also overpredicted the B-1 and B-2 reference bundle data at the higher Reynolds numbers.



* J. F. Mincey, "Steady-State Axial Pressure Losses Along the Exterior of Deformed Fuel Cladding: Multirod Burst Test (MRBT) Bundles B-1 and B-2," NUREG/CR-1011, ORNL/NUREG/TM-350, Oak Ridge National Laboratory, January 1980.

FIGURE 2-13 FRICTION FACTOR (4f) AND SPACER GRID LOSS COEFFICIENTS (Kg) AS A FUNCTION OF REYNOLDS NUMBER FOR THE B-5R BUNDLE

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3. DISCUSSION

If the factor of four increase in overall pressure loss for B-5 (compared to B-5R) is assumed only due to an increase in fluid velocity resulting from reduced flow area, the necessary increase in velocity would be a factor of two. In turn, this indicates a flow area reduction in B-5 of about 50%. This is a large area reduction but consistent with visual observations of the B-5 bundle. The increase in pressure loss for the B-5 bundle is substantially larger than that measured with MRBT bundles B-1 and B-2*. For these two bundles the overall pressure loss increased by a factor of 1.5 - 2., while the average reduction in flow area was about 20%.

For the B-1 and B-2 bundles, the flow area reduction was quite uniformly distributed along the length of the bundles. This was reflected in the measured pressure loss which tended to increase monatonically along the length of the bundles. The sawtooth shape of the B-5 bundle pressure loss profile shows a non-uniform flow area reduction with length, and this indicates regions of coplanar blockage.

In addition to providing data suitable for a straightforward quantitative evaluation, the B-5R pressure loss data also provided a check on individual pressure taps in the flow containment walls. Nicks or burrs on the opening of a pressure tap hole can escape visual detection. The consistency of the individual pressure measurements on the B-5R bundle provided a good criterion for identifying pressure taps yielding spurious data. Of the 480 pressure taps, eight were found to yield inconsistent data. These pressure taps are easily recognized in the individual pressure loss profiles for the B-5R bundle and are identified in Appendix C.

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* Mincey, op cit.

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4. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The pressure loss data presented in this report characterizes in detail the hydraulic resistance of MRBT bundle B-5. The average flow area reduction in the B-5 bundle is substantially greater than that reported for MRBT bundles B-1 and B-2. The shape of the B-5 bundle pressure loss profile indicates regions of flow area reduction that are essentially coplanar.

RECOMMENDATIONS

The data for the B-5 bundle should be compared to the predictions of an applicable subchannel hydraulics computer program (e.g. COBRA-IV). This comparison should include not only axial pressure profiles but should also include the magnitude and variation of lateral pressure gradients which are indicative of fluid crossflow and the distribution of flow in the B-5 bundle.

Submitted by:	Reviewed by:	Approved by:
R. T. Bailey	R. K. Kim	P. A. Pfund 1/13/82

QUALITY ASSURANCE

To the best of my knowledge and belief, this project was conducted in accordance with the Quality Assurance Plan for the Multirod Burst Test Bundle dated November 6, 1980, and approved by Oak Ridge National Laboratory on November 20, 1980 (QA-80013).

1-13-82

G. W. Roberts
Quality Assurance Manager,
Alliance Research Center

APPENDIX A

APPARATUS AND PROCEDURE

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APPENDIX A

APPARATUS AND PROCEDURE

A.1 APPARATUS

A.1.1 Flow Loop

Water flow for these tests was provided by a cold water recirculating loop shown schematically in Figure A-1. The loop piping is entirely stainless steel. The fiberglass water storage tanks upstream of the pumps have a 47 m^3 (12,500 gal) capacity and are operated individually. The noncorrosive pumps, rated at 1 MPa (150 psi) and 7.6 m^3/min (2000 gpm) each, can be operated individually, in series, or in parallel. Water flow rate was regulated using an air-actuated control valve and was measured with turbine meters. The temperature of the water in the system can be quickly increased using a steam lance in the return piping. The water temperature in the loop was maintained constant by regulating a cold water flow rate on a feed and bleed system.

A.1.2 Flow Shroud and Pressure Taps

The flow shroud, shown in Figure A-2, was constructed of 5-cm (2-inch) thick acrylic plastic. The flow cross-section was sized so that the equivalent hydraulic diameter of the combined wall and corner subchannels was the same as a unit subchannel of design basis (B&W 15 x 15 geometry).

The static pressure taps were distributed along the length of the flow shroud at 40 axial locations as shown in Figure A-2. The axial locations of the 40 pressure planes relative to the start of the heated zone on the B-5 bundle are given in Table A-1. The pressure taps within each grid span were located on 2.541 cm (1.000 inch) centers. Within a grid span, the distance from the bottom and top pressure taps to the nearest grid was the same. At each of the 40 axial locations, 12 pressure taps were distributed around the periphery of the housing

(three taps on each of four walls, Figure A-3). The pressure taps were centered in the wall subchannels as shown. The nominal diameter of the pressure tap hole at the subchannel boundary was 1.59 mm (0.0625 inch).

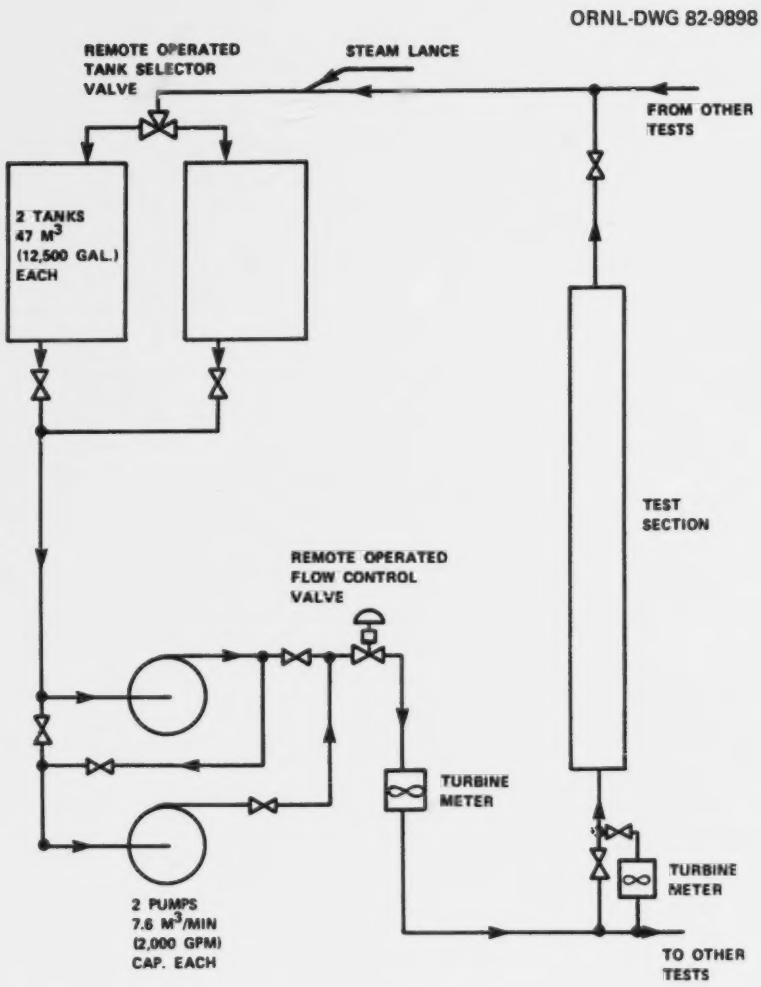

FIGURE A-1 SCHEMATIC OF THE COLD WATER FLOW LOOP

ORNL-DWG 82-9899

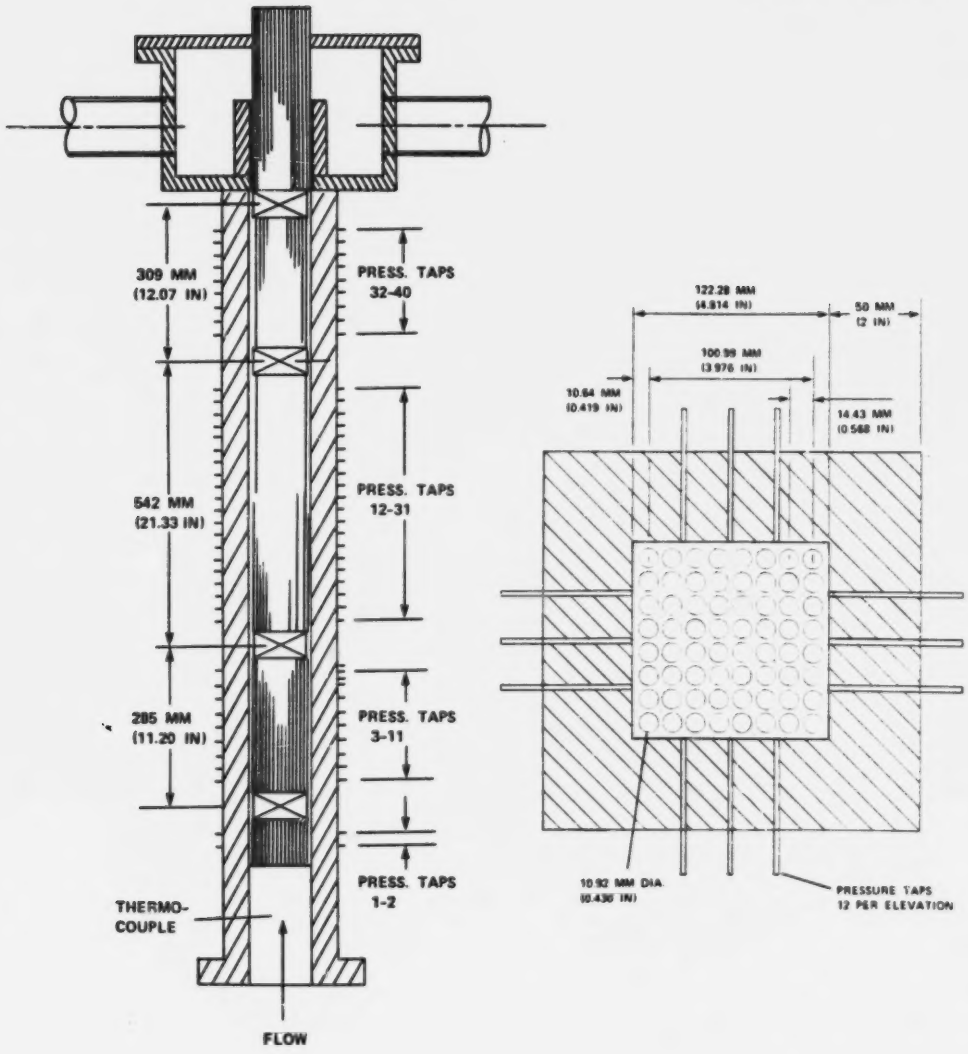

FIGURE A-2 CROSS-SECTIONAL VIEWS OF THE FLOW HOUSING

TABLE A-1

AXIAL LOCATION OF THE PRESSURE TAPS REFERENCED TO THE START OF THE HEATED ZONE ON THE B-5 BUNDLE

Pressure Plane	Axial Location (cm)	Pressure Plane	Axial Location (cm)	Pressure Plane	Axial Location (cm)	Pressure Plane	Axial Location (cm)
1	-25.42	11	5.90	21	35.80	31	61.21
2	-22.88	12	12.93	22	38.34	32	69.31
3	-14.42	13	15.47	23	40.88	33	71.85
4	-11.88	14	18.01	24	43.42	34	74.39
5	-9.34	15	20.55	25	45.96	35	76.93
6	-6.80	16	23.09	26	48.50	36	79.47
7	-4.26	17	25.63	27	51.04	37	82.01
8	-1.72	18	28.17	28	53.58	38	84.55
9	0.82	19	30.72	29	56.12	39	87.09
10	3.36	20	33.26	30	58.66	40	89.63

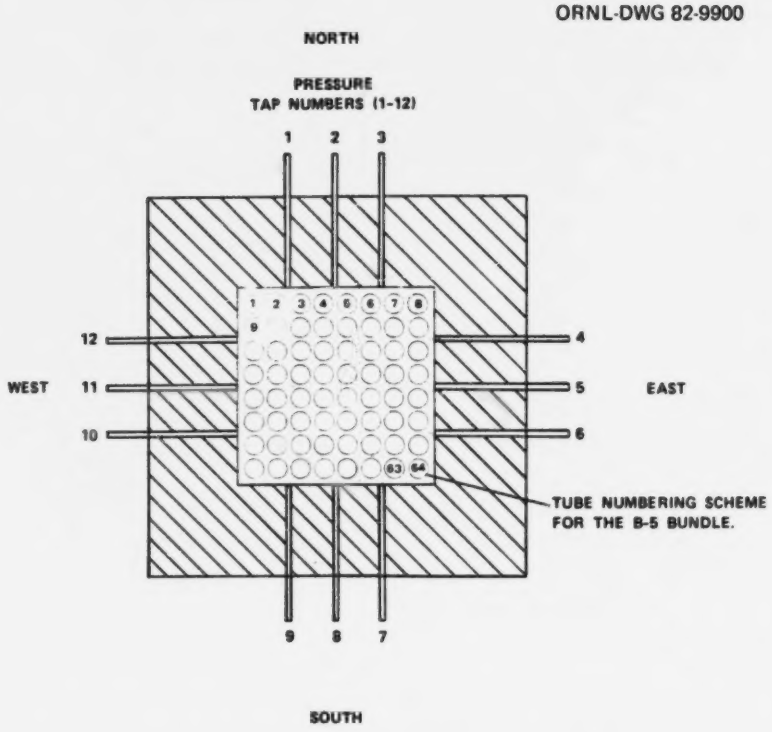

FIGURE A-3 TOP VIEW OF FLOW HOUSING CROSS-SECTION SHOWING PRESSURE TAP NUMBERING SCHEME AND THE B-5 BUNDLE ORIENTATION

The lateral placement of the tube bundles in the flow housing was adjusted using set screws in the housing walls located at each spacer grid. With the B-5R bundle, the outside perimeter of the tubes was centered in the flow housing to provide a uniform hydraulic diameter in the wall subchannels. With the B-5 bundle, the spacer grids were centered in the flow housing because clad deformation eliminated an identifiable bundle perimeter.

A.1.3 Test Bundles

The B-5 bundle was an 8 x 8 array that was burst tested at Oak Ridge National Laboratory (ORNL) under simulated Loss-of-Coolant Accident (LOCA) conditions. The B-5R bundle simulated the B-5 bundle in a preburst or nominal geometry. The bundle geometry was B&W's 15 x 15 fuel assembly design. The nominal tube diameters were 10.92 mm (0.430 inch) and were located on a square pitch of 14.43 mm (0.568 inch).

The B-5 bundle was flow tested in an as-burst condition, with the exception of pointed tube extensions added to the upstream end of the bundle. The tube extensions provided a smooth hydraulic transition from an open cross-section to a bundle cross-section. The axial location of the spacer grids relative to the start of the heated zone is given in Table A-2. The B-5R bundle was fabricated using spacer grids and Zircaloy tubing supplied by ORNL. The B-5R bundle length, including pointed tube extensions and the distribution of spacer grids along the bundle, was the same as for the B-5 bundle. After assembly of the B-5R bundle, the rod-to-rod gaps at four axial positions on the bundle were measured and are shown in Figure A-4. The average measured rod-to-rod gap of 3.49 mm is very near the design value of 3.51 mm.

A.1.4 Pressure Scanning and Measuring System

Pressure loss along the length of the B-5 and B-5R bundles was obtained using a Scanivalve System and differential pressure transducers. The computer-operated Scanivalve System was used to sequentially select 480 differential pressures formed by the pressure taps in the flow housing walls. Computer-operated solenoid valves were used to automatically select the differential pressure transducer of the proper range.

TABLE A-2

AXIAL LOCATION OF THE SPACER GRIDS
REFERENCED TO THE START OF THE HEATED ZONE ON THE B-5 BUNDLE

Spacer Grid Number	Axial Location (cm)	
	Center	Range
1	-18.5	-20.3 to -16.6
2	10.0	8.2 to 11.8
3	64.2	62.4 to 66.0
4	94.9	93.0 to 96.7

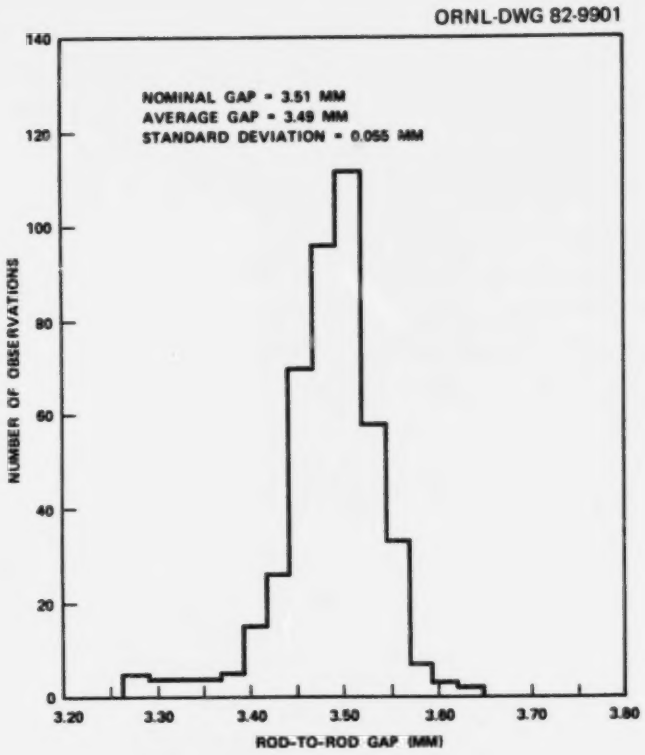

FIGURE A-4 HISTOGRAM OF ROD - ROD GAPS FOR THE B-5R BUNDLE

The Scanivalve System consists of 10 module switches and two wafer switches, shown schematically in Figure A-5. Each module switch has 48 pressure input ports and one pressure output port, while the wafer switches have 12 input ports and one output port. The output pressure lines from the module switches are connected to the "low-side" wafer switch.

For each of the 10 modules, a suitable reference pressure was chosen and connected to the "high-side" wafer switch, which is operated synchronously with the low-side switch. The output pressure lines from the wafers provide a low and high pressure for the differential pressure transducers. The independent positioning of the module and wafer switches permitted individual measurements of 480 differential pressures, from which the cumulative pressure loss to each pressure tap was calculated.

Figure A-5 also shows the pressure tap connection logic to the Scanivalve System. Pressure taps are identified by a double integer (I, J): the first integer refers to the pressure tap elevation (Figure A-2 and Table A-1); the second integer refers to the circumferential position of the pressure tap on the flow housing wall (Figure A-3).

As shown in Figure A-6, the "high" and "low" pressure lines were connected to the differential pressure transducers through computer-operated solenoid valves. Each differential pressure was first measured with the largest range transducer, while the other two transducers remained isolated from potentially excessive pressures. Based on this initial measurement, the differential pressure was then measured and recorded using the transducer that provided the most sensitivity without over-ranging.

A.1.5 Instrumentation

A list of the instruments used to provide test data is given in Table A-3. Instruments calibration was certified as traceable to the National Bureau of Standards.

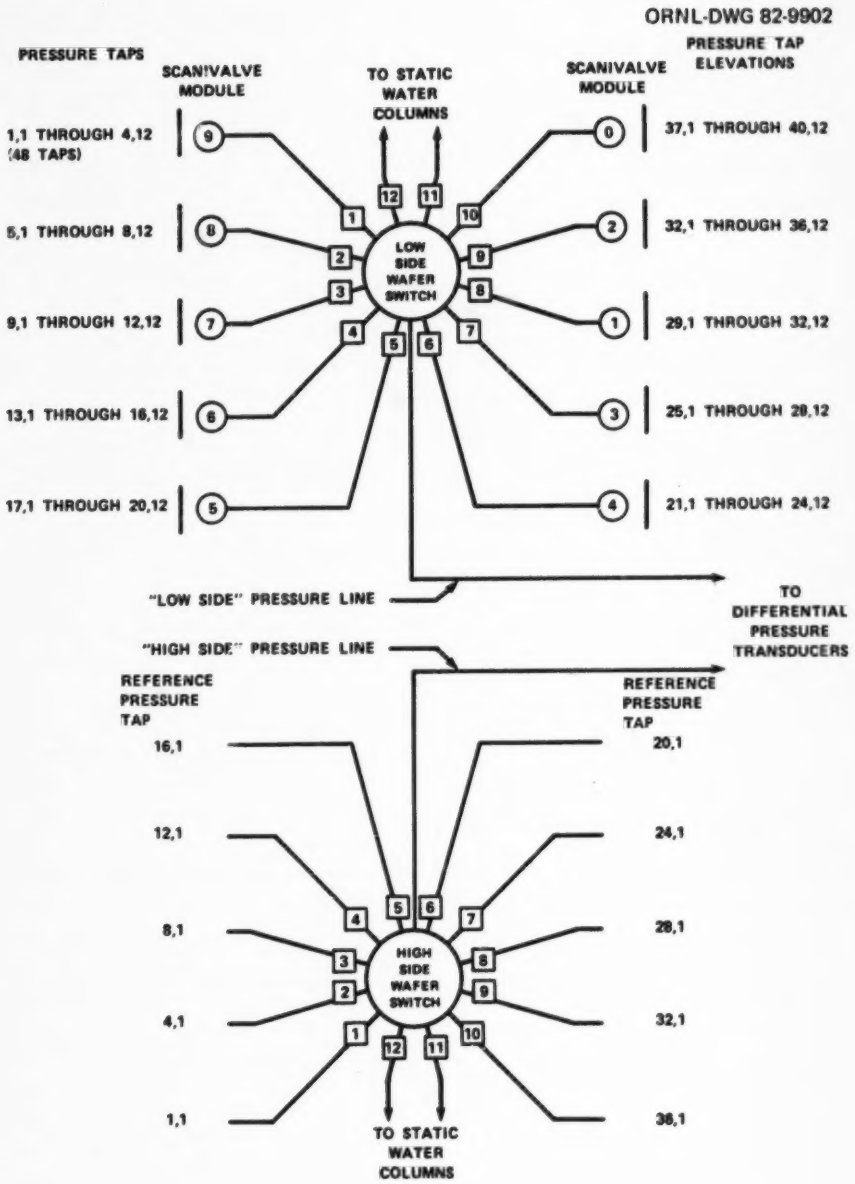

FIGURE A-5 ARRANGEMENT OF PRESSURE TAP LINES ON THE SCANIVALVE SYSTEM

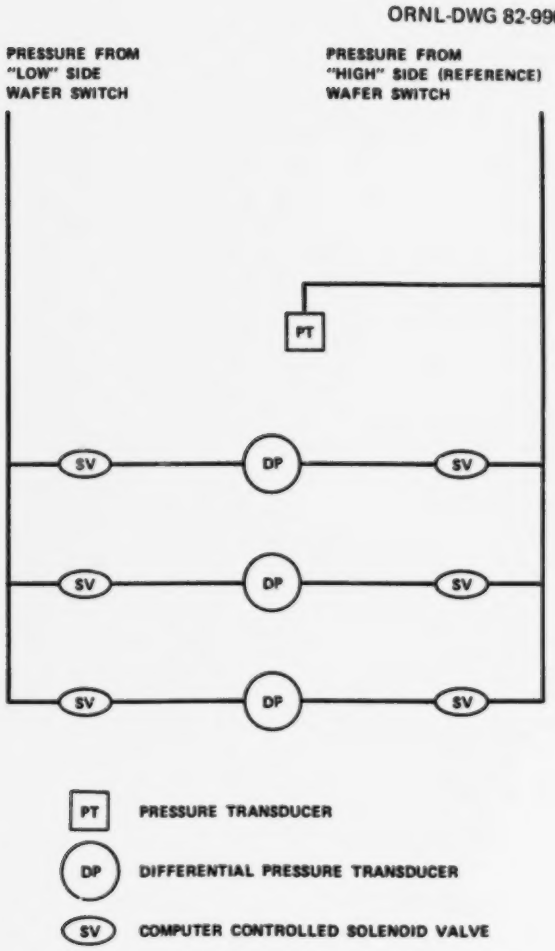

FIGURE A-6 SCHEMATIC OF PRESSURE LINE CONNECTION TO PRESSURE AND DIFFERENTIAL PRESSURE TRANSDUCERS

TABLE A-3

LIST OF INSTRUMENTATION FOR WATER FLOW TESTING OF THE MRBT BUNDLE

	Description	Manufacturer	Model	Serial Number	Range	Accuracy
1)	Turbine Meter	Brooks Inst.	PAR-1-TY	750139	128 to 1170 m^3/h	±0.25% of reading
2)	Turbine Meter	Brooks Inst.	HP 64	650288	22 to 340 m^3/h	±0.5% of reading
3)	Pressure Transducers	Bailey	BQ	780406	690 kPa differential	±0.25% of span
		Rosemount	1151DP	720117	125 kPa differential	±0.25% of span
		Bailey	BQ	720051	37 kPa differential	±0.25% of span
		Bailey	BQ	730143	7.5 kPa differential	±0.25% of span
		Barton	369	730126	1.4 MPa gage	±0.5% of full-scale
4)	Thermocouple Type K	Leeds and Northrup	Chromel/ Alumel	P053043	0°C to 277°C	±1°C
5)	Reference Junction	Acromag, Inc.	324CA	710256	0°C set point	Set point accuracy ±0.1°C
6)	Digital Voltmeter	Hewlett-Packard	2401 C	700034	0 - 100 volts max in 5 ranges (multiples of 10)	±0.01% of reading 0.005% full-scale ±1 digit
7)	Preset Counter	Hewlett-Packard	5214 L	690260	2 Hz to 300 kHz	±1 count

A.2 TEST PROCEDURE

The test procedure primarily involved the setup of test conditions and several checks that ensured correct operation of the pressure scanning system. The process of data acquisition was entirely automated with the use of a Hewlett-Packard RTE computer system.

At the start of testing, the pump was started and water was recirculated around a loop which bypassed the flow housing. Steam was supplied to the lance in the return line and the water in the system was heated to a nominal temperature of 49°C. While the water was heating, checks were performed on the pressure scanning system. These checks consisted of a series of measurements that ensured correct operation of the differential pressure transducers, the Scanivalve System and all pressure tap lines. These checks included:

1) Differential pressure transducer zero and span readings. The zero reading was checked by opening a bypass valve between the high and low sides of the transducer. The span reading was checked using static water columns.

2) Measurement of all 480 flow housing differential pressures under no-flow conditions using the lowest range (most sensitive) transducer, and measurement of 48 differential pressures using the larger range transducers. Under no-flow conditions, the differential pressures on the flow housing are essentially "zero" readings. This check ensured that air was not trapped in any pressure tap lines.

After these checks were completed and the desired water temperature attained, water flow was routed through the flow housing and the flow rate set to the required value. The data acquisition system was then started.

As shown schematically in Figure A-5, the 480 pressure taps are divided into 10 blocks of 48, which correspond to the 10 module switches. Flow rate, temperature and the gauge pressure of the reference tap were recorded before each block of 48 differential pressures was measured and after the last block of 48 was measured.

The computer-operated Scanivalve System was sequentially stepped through each block of 48 pressure taps. Each differential pressure was first measured using the largest range transducer while lower range transducers were isolated from the possibility of over-ranging. Based on this initial measurement, the computer selected the transducer that provided the most accurate measurement and recorded the data.

Each time a new pressure tap was selected, or a different transducer valved into service, the pressures in the pressure tap lines underwent a hydraulic transient. In order to eliminate this influence on the measurements, data recording was delayed for approximately three seconds after the solenoid valves for a transducer were opened. The differential pressure was then averaged over a three-second time period.

After all measurements were completed, a summary of recorded data was printed at a computer terminal. If the data appeared satisfactory, it was transferred to a PDP 11/70 computer for data reduction and analysis.

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APPENDIX B

DATA REDUCTION AND ERROR ANALYSIS

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APPENDIX B

DATA REDUCTION AND ERROR ANALYSIS

B.1 DATA CONVERSION

Raw test data was converted to engineering units using fourth-order polynomial curve fits of instrument calibration data. Using this technique, the calculations of flow rate and temperature was straightforward and required no further analysis. After the differential pressures were converted to engineering units, each measurement was corrected for the density difference between the water in the flow housing (~49°C) and the water in the pressure tap lines (~21°C). Starting with Pressure Plane 1, each differential pressure was added to its respective reference pressure to obtain the cumulative pressure loss to each pressure tap location on the bundle.

B.2 CALCULATIONS

Calculations consist of bundle Reynolds number, bare tube friction factor and various loss coefficients.

The Reynolds number was calculated as:

$$Re = \frac{\rho Q \, D_h}{A \, \mu}$$

where:

- Q = volume flow rate
- D_h = bundle average hydraulic diameter for the undeformed bundle geometry
- A = cross-sectional flow area for the undeformed bundle geometry

μ = absolute viscosity of water at the measured temperature and pressure

ρ = density of water at the measured temperature and pressure

Friction factor and spacer grid loss coefficients were calculated for the B-5R bundle only. The bare tube friction factor was calculated as:

$$4f = (\Delta P_{14-29}) / \left(\frac{\rho Q^2}{2 A^2} \frac{L_{14-29}}{D_h}\right)$$

where:

$4f$ = friction factor

ΔP_{14-29} = bundle average differential pressure between Pressure Planes 14 and 29

L_{14-29} = axial distance between Pressure Planes 14 and 29

Spacer grid loss coefficients are calculated as:

$$K_\ell = (\Delta P_{i,j}) / \left(\frac{\rho Q^2}{2 A^2}\right) - 4f \frac{L_{i,j}}{D_h}$$

where:

$4f$ = friction factor calculated from the correlation $4f = 0.184\ Re^{-0.2}$

K_ℓ = loss coefficient for Spacer Grid ℓ, where ℓ = 1, 2 or 3

i,j = 1 and 4 for Spacer Grid 1
= 9 and 14 for Spacer Grid 2
= 29 and 34 for Spacer Grid 3

Calculated friction factors, grid loss coefficients and Reynolds numbers for the B-5R bundle are given in Table B-1.

TABLE B-1

REYNOLDS NUMBERS, FRICTION FACTORS AND SPACER GRID LOSS COEFFICIENTS FOR THE B-5R BUNDLE

$Re_{(\times 10^{-5})}$	$4f$	K_1	K_2	K_3	Run Number
0.177	0.0355	0.587	0.670	0.561	19
0.173	0.0285	0.599	0.623	0.567	21
0.325	0.0243	0.564	0.519	0.512	12
0.324	0.0267	0.586	0.532	0.496	20
0.556	0.0220	0.568	0.464	0.457	13
0.569	0.0218	0.562	0.485	0.464	18
1.01	0.0195	0.527	0.442	0.424	14
1.01	0.0192	0.555	0.454	0.438	17
1.71	0.0173	0.528	0.430	0.416	15
1.71	0.0172	0.543	0.436	0.419	16

The overall bundle loss coefficients are given in Table B-2 and are calculated as:

$$K_B = (\Delta P_{1,40}) / (\frac{\rho Q^2}{2 A^2})$$

where:

K = overall bundle loss coefficient

TABLE B-2

REYNOLDS NUMBERS AND OVERALL LOSS COEFFICIENTS FOR THE B-5 AND B-5R BUNDLES

$Re_{(\times 10^{-5})}$	K_{B-5}	Run Number	$Re_{(\times 10^{-5})}$	K_{B-5R}	Run Number
0.174	17.1	9	0.177	4.40	19
0.174	17.6	10	0.173	4.22	21
0.327	15.8	1	0.325	3.69	12
0.319	16.5	4	0.324	3.75	20
0.553	15.3	2	0.556	3.38	13
0.558	15.7	5	0.569	3.37	18
1.01	14.3	3	1.01	3.04	14
1.01	14.4	6	1.01	3.08	17
1.70	13.8	7	1.71	2.84	15
1.71	13.8	8	1.71	2.86	16

B.3 ERROR ANALYSIS

Measurements of flow rate, temperature and differential pressure were analyzed to determine probable error. The error analysis was based on manufacturers' rated accuracy and calibration records and included measurement error as well as inherent instrument errors. The probable error in a measurement was determined from the sum of the squares of the individual errors.

The probable error in temperature is 1.1°C and is constant for all tests. The relative error in flow rate is given in Table B-3 for the different flow rates tested. The relative error in differential pressure is more complex. Any one of four different transducers were used, depending on the magnitude of the differential pressure to be measured. Also, because of the "moving reference" technique used for measuring the differential pressures, the relative error in cumulative pressure loss is dependent on multiple measurements. In order to assess trends in probable differential pressure errors, the relative error was calculated for each reference pressure tap, and for Pressure Tap 40,1 which represents the overall bundle pressure loss. These errors are given in Table B-4 for each of the different flows and for each bundle. The overall bundle pressure loss and the associated aboslute error is shown in Table B-5.

TABLE B-3

RELATIVE ERROR IN MEASURED FLOW RATE

Flow Rate (m^3/s)	Relative Error (%)
0.0063	1.9
0.0120	1.1
0.0208	0.7
0.0379	0.6
0.0631	0.3

TABLE B-4

RELATIVE ERROR (%) IN CUMULATIVE PRESSURE LOSS AT THE REFERENCE PRESSURE TAPS FOR EACH BUNDLE AT EACH FLOW RATE

Bundle	Flow Rate (m^3/s)	Pressure Tap Number									
		4,1	8,1	12,1	16,1	20,1	24,1	28,1	32,1	36,1	40,1
B-5	0.0064	9.5	13.3	6.2	2.5	2.8	3.3	3.5	4.2	3.5	4.4
	0.0120	2.7	4.8	1.9	1.5	1.5	1.7	1.7	1.9	1.6	1.9
	0.0207	0.9	1.5	1.4	0.7	0.7	1.0	1.0	1.4	1.2	1.6
	0.0376	1.3	1.2	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.2
	0.0633	0.5	0.8	0.6	0.9	0.9	0.9	0.9	1.1	1.3	1.9
B-5R	0.0064	8.4	13.5	11.0	12.4	14.6	15.2	16.4	14.7	15.6	16.5
	0.0120	2.7	4.3	3.6	4.4	4.9	5.5	5.9	5.2	5.5	5.7
	0.0207	0.9	1.5	1.3	1.6	1.8	1.9	2.1	1.9	2.0	2.1
	0.0376	1.6	1.5	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6
	0.0633	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

TABLE B-5

CUMULATIVE PRESSURE LOSS TO PRESSURE TAP 40,1 AND ASSOCIATED ABSOLUTE ERROR FOR EACH FLOW RATE AND BUNDLE TESTED

Bundle	Flow Rate (m^3/s)	Bundle Pressure Loss (kPa)	Absolute Error (kPa)
B-5	0.0064	4.34	0.19
	0.0120	14.1	0.27
	0.0207	40.2	0.64
	0.0376	124.8	1.5
	0.0633	349.1	6.6
B-5R	0.0064	1.14	0.19
	0.0120	3.26	0.19
	0.0207	8.85	0.19
	0.0376	26.3	0.42
	0.0633	69.5	0.42

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APPENDIX C

PRESSURE LOSS DATA – TABULATIONS AND PLOTS

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APPENDIX C

PRESSURE LOSS DATA – TABULATIONS AND PLOTS

Contained in this appendix are plots and tabulations of the pressure loss data for the B-5 and B-5R bundles. A review of the B-5R bundle data indicated several consistently erroneous pressure measurements. The source of the error was probably defective pressure tap holes in the flow housing, and these tap positions are listed in Table C-1. The numbering scheme for the pressure taps distributed around the periphery of the flow housing is shown in Figure C-1. The erroneous pressure measurements are easily identifiable in the pressure loss plots for the B-5R bundle, since these measurements deviate from the "normal" pressure loss profile. These measurements are virtually undetectable in the plots of the B-5 data because of the scaling of the plots (~5:1 compared to the B-5R) and because of the point-to-point fluctuations in pressure loss. An attempt to "correct" these measurements was not made for two reasons: 1) an analysis of the B-5R pressure data does not depend on these measurements; 2) there is insufficient information to accurately correct the B-5 pressure data.

TABLE C-1

LIST OF PRESSURE TAPS WHICH GIVE INCONSISTENT PRESSURE LOSS DATA

Pressure Plane	Pressure Tap Number	Axial Location* (cm)
5	10	- 9.3
6	4	- 6.8
18	10	28.2
23	9	40.9
26	9	48.5
27	8	51.0
36	7	79.4
37	7	82.0

* Referenced to the start of the heated zone.

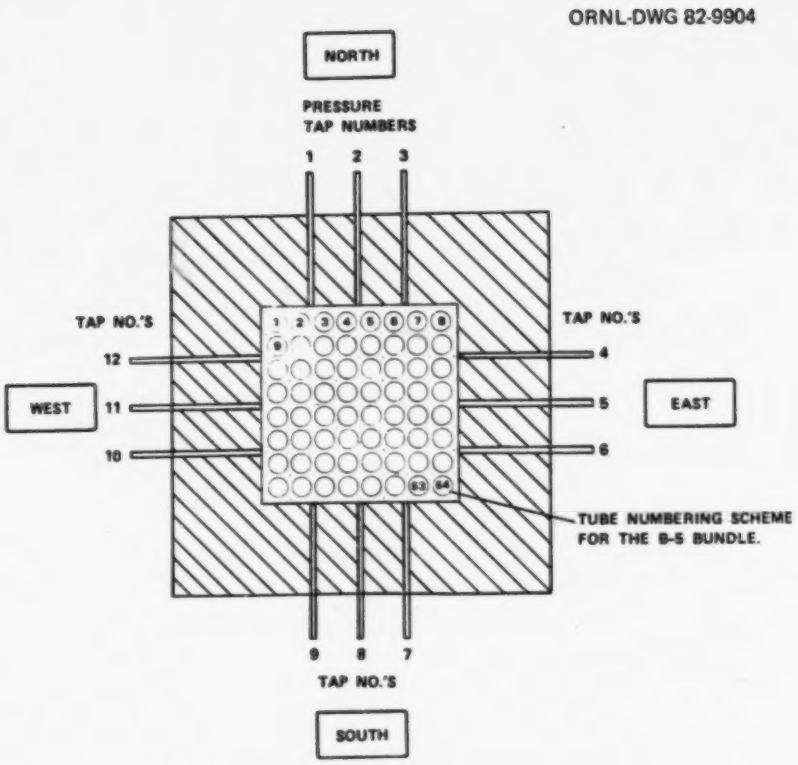


FIGURE C-1 TOP VIEW OF FLOW HOUSING CROSS-SECTION SHOWING PRESSURE TAP NUMBERING SCHEME AND THE B-5 BUNDLE ORIENTATION

Data tabulations are presented for all tests, including repeat data, and consist of the following:

- Cumulative pressure loss as a function of axial position for each pressure tap position around the circumference of the bundle
- Average cumulative pressure loss as a function of axial position for each side of the bundle (average of the three pressures on each side)
- Bundle average cumulative pressure loss as a function of axial position (average of the four sides).

These tabulated data are also plotted. Data for only one of the two tests at each flow rate is presented. A cross-reference of run number, flow rate and page numbers for tabulated and plotted data are given in Table C-2.

TABLE C-2

CROSS-REFERENCE OF RUN NUMBER AND FLOW RATE
WITH THE PAGE NUMBERS OF TABULATED AND PLOTTED DATA

Run Number	Flow Rate (m^3/sec)	Page Number for Data Tabulation	Page Number for Data Plots		
			Bundle Average	Side Average	Individual Tap Positions
1	0.0120	C-4 - C-5	C-46	C-51	C-52 - C-55
2	0.0205	C-6 - C-7	C-47	C-56	C-57 - C-60
3	0.0375	C-8 - C-9	C-48	C-61	C-62 - C-65
4	0.0119	C-10 - C-11	---	---	---
5	0.0207	C-12 - C-13	---	---	---
6	0.0376	C-14 - C-15	---	---	---
7	0.0636	C-16 - C-17	---	---	---
8	0.0631	C-18 - C-19	C-49	C-66	C-67 - C-70
9	0.0064	C-20 - C-21	C-50	C-71	C-72 - C-75
10	0.0064	C-22 - C-23	---	---	---
11	0.0065	C-24 - C-25	---	---	---
12	0.0120	C-26 - C-27	C-46	C-76	C-77 - C-80
13	0.0207	C-28 - C-29	---	---	---
14	0.0376	C-30 - C-31	C-48	C-81	C-82 - C-85
15	0.0632	C-32 - C-33	C-49	C-86	C-87 - C-90
16	0.0632	C-34 - C-35	---	---	---
17	0.0375	C-36 - C-37	---	---	---
18	0.0207	C-38 - C-39	C-47	C-91	C-92 - C-95
19	0.0065	C-40 - C-41	C-50	C-96	C-97 - C-100
20	0.0120	C-42 - C-43	---	---	---
21	0.0064	C-44 - C-45	---	---	---

RUN NUMBER: 1 BUNDLE: B-5 REYNOLDS NO. 3.27E+04
AVERAGE FLOW RATE: 0.0120 M**3/SEC. AVERAGE TEMPERATE: 50.5 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	2	3	NORTH SIDE AVERAGE		4	TAP NUMBER 5	6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.009	-0.009	0.006	-0.004	-	0.004	0.010	0.017	0.010	-0.004
-22.9	0.017	0.024	0.025	0.022	-	0.102	0.105	0.084	0.097	0.075
-14.4	0.619	0.696	0.663	0.660	-	0.705	0.762	0.691	0.720	0.689
-11.9	0.694	0.600	0.665	0.653	-	0.685	0.698	0.816	0.733	0.714
-9.3	0.740	0.740	0.731	0.737	-	0.758	0.733	0.753	0.748	0.757
-6.8	0.690	0.802	0.857	0.783	-	0.896	0.760	0.835	0.830	0.799
-4.3	0.772	0.865	0.856	0.831	-	0.815	0.824	0.708	0.782	0.808
-1.7	0.771	0.930	0.898	0.866	-	0.780	0.793	0.872	0.815	0.852
0.8	0.858	0.903	0.884	0.882	-	0.914	0.835	0.839	0.862	0.844
3.4	1.150	1.173	1.191	1.171	-	1.206	1.097	1.212	1.172	1.120
5.9	1.390	1.326	1.424	1.380	-	1.441	1.359	1.336	1.379	1.308
12.9	3.060	3.039	3.101	3.067	-	3.002	2.631	2.593	2.742	2.816
15.5	4.473	4.342	4.376	4.397	-	4.152	3.569	4.073	3.931	4.781
18.0	5.344	5.286	5.119	5.249	-	5.756	6.434	7.172	6.454	6.195
20.5	7.231	6.237	6.472	6.647	-	8.733	8.572	7.559	8.288	7.947
23.1	10.349	10.294	9.438	10.027	-	8.529	8.243	6.824	7.866	8.982
25.6	12.022	12.976	11.387	12.128	-	8.431	7.915	6.964	7.770	9.619
28.2	10.649	10.705	10.228	10.527	-	8.643	8.681	8.661	8.662	9.352
30.7	10.077	9.627	9.592	9.765	-	9.330	8.813	9.599	9.080	9.074
33.2	11.483	11.057	11.105	11.215	-	11.345	9.092	9.469	9.969	11.563
35.8	12.488	12.342	11.972	12.267	-	12.291	12.987	13.333	12.870	12.773
38.3	11.745	11.425	11.159	11.443	-	11.217	12.755	12.053	12.008	11.746
40.9	11.249	10.971	10.917	11.045	-	10.787	10.519	10.477	10.594	11.170
43.4	10.884	11.549	11.416	11.283	-	11.346	10.637	9.970	10.651	11.090
45.9	10.627	10.696	10.685	10.670	-	10.922	11.455	12.872	11.750	11.193
48.5	11.077	10.984	11.067	11.043	-	11.437	11.895	12.574	11.969	11.414
51.0	11.501	11.271	11.224	11.332	-	12.089	12.412	12.250	12.250	11.622
53.6	12.180	12.679	12.521	12.460	-	12.501	12.288	12.472	12.420	12.519
56.1	11.685	11.756	12.073	11.838	-	11.745	11.968	12.031	11.915	12.083
58.6	11.392	11.339	11.427	11.386	-	11.586	11.645	11.784	11.672	11.623
61.2	10.835	10.990	11.038	10.954	-	11.302	11.620	11.630	11.517	11.389
69.3	11.511	11.258	10.999	11.256	-	12.396	13.413	13.659	13.156	12.954
71.8	13.495	13.824	12.870	13.396	-	14.241	15.416	15.349	15.002	14.391
74.4	14.606	14.205	15.077	14.630	-	15.342	14.940	14.882	15.054	15.040
76.9	17.203	16.861	15.968	16.677	-	15.057	15.099	14.465	14.874	15.465
79.4	15.607	16.841	16.195	16.215	-	15.081	14.512	14.392	14.662	15.029
82.0	14.886	14.930	14.787	14.868	-	14.697	14.562	14.441	14.567	14.573
84.5	14.541	14.399	14.440	14.460	-	14.506	14.562	14.294	14.454	14.343
87.1	14.285	14.451	14.362	14.366	-	14.355	14.260	14.080	14.232	14.224
89.6	14.134	14.144	14.217	14.165	-	14.280	14.139	13.907	14.109	14.010

RUN NUMBER: 1
AVERAGE FLOW RATE: 0.0120 M**3/SEC.

BUNDLE: B-5
AVERAGE TEMPERATE: 50.5 DEG.C

REYNOLDS NO. 3.27E+04

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER			SOUTH SIDE AVERAGE		TAP NUMBER			WEST SIDE AVERAGE	BUNDLE AVERAGE
	7	8	9			10	11	12		
-25.4	-0.037	-0.075	-0.001	-0.038		0.072	0.015	-0.046	0.014	-0.004
-22.9	0.029	0.077	0.109	0.071		0.211	0.072	0.046	0.109	0.075
-14.4	0.674	0.737	0.691	0.701		0.709	0.677	0.645	0.677	0.689
-11.9	0.713	0.698	0.741	0.717		0.761	0.710	0.790	0.754	0.714
-9.3	0.857	0.757	0.725	0.780		0.794	0.742	0.747	0.761	0.757
-6.8	0.809	0.807	0.721	0.779		0.776	0.845	0.786	0.802	0.799
-4.3	0.816	0.792	0.675	0.761		0.815	0.809	0.947	0.857	0.808
-1.7	0.748	0.864	0.847	0.820		0.878	0.890	0.952	0.907	0.852
0.8	0.805	0.778	0.797	0.793		0.808	0.865	0.839	0.837	0.844
3.4	1.045	1.071	1.009	1.042		1.056	1.064	1.161	1.094	1.120
5.9	1.186	1.209	1.220	1.205		1.239	1.259	1.307	1.268	1.308
12.9	2.608	2.732	2.492	2.611		2.626	2.751	3.161	2.846	2.816
15.5	4.116	4.044	4.043	4.068		6.519	7.355	6.313	6.729	4.781
18.0	5.663	5.280	6.521	5.822		7.738	7.048	6.974	7.253	6.195
20.5	7.102	7.874	9.488	8.155		9.841	8.242	8.019	8.700	7.947
23.1	7.258	8.364	9.278	8.300		10.039	10.017	9.154	9.737	8.982
25.6	7.032	7.830	9.740	8.200		9.653	10.907	10.575	10.378	9.619
28.2	6.498	6.126	8.846	7.157		11.199	11.032	10.952	11.061	9.352
30.7	5.826	6.161	10.260	7.416		10.382	10.210	9.514	10.035	9.074
33.2	12.307	14.291	14.519	13.705		10.765	10.956	12.365	11.362	11.563
35.8	12.378	14.520	13.409	13.436		12.039	12.203	13.308	12.517	12.773
38.3	12.716	11.985	11.617	12.106		11.295	11.491	11.492	11.426	11.746
40.9	11.797	12.029	11.775	11.867		11.337	11.081	11.107	11.175	11.170
43.4	11.760	11.797	11.903	11.820		11.078	10.592	10.145	10.605	11.090
45.9	11.851	11.619	11.686	11.719		11.123	10.717	10.055	10.632	11.193
48.5	12.033	11.650	11.485	11.723		11.255	10.861	10.654	10.923	11.414
51.0	12.240	11.989	11.763	11.997		11.253	10.583	10.894	10.910	11.622
53.6	12.405	12.867	12.686	12.653		12.229	12.699	12.701	12.543	12.519
56.1	12.134	12.002	12.025	12.053		12.324	12.664	12.589	12.526	12.083
58.6	11.835	11.772	11.801	11.802		11.831	11.587	11.474	11.630	11.623
61.2	11.781	11.814	11.736	11.777		11.526	11.328	11.065	11.307	11.389
69.3	13.698	13.946	13.908	13.851		13.863	13.761	13.035	13.553	12.954
71.8	14.495	14.267	14.684	14.482		14.750	14.909	14.387	14.682	14.391
74.4	14.748	14.770	14.974	14.831		14.892	15.532	16.513	15.645	15.040
76.9	14.789	15.005	14.865	14.886		14.862	15.209	16.196	15.422	15.465
79.4	14.346	14.493	14.467	14.435		14.708	14.769	14.942	14.806	15.029
82.0	14.435	14.205	14.333	14.324		14.361	14.527	14.708	14.532	14.573
84.5	14.203	14.274	14.247	14.241		14.189	14.188	14.276	14.218	14.343
87.1	14.098	14.117	14.102	14.106		14.128	14.244	14.203	14.192	14.224
89.6	13.927	13.767	13.873	13.856		13.786	13.942	14.002	13.910	14.010

RUN NUMBER 2 BUNDLE: B-5 REYNOLDS NO. 5.53E+04
AVERAGE FLOW RATE: 0.0205 M**3/SEC. AVERAGE TEMPERATE: 49.8 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.020	-0.036	-0.033	-0.030	0.057	-0.104	-0.021	-0.023	-0.005
-22.9	-0.039	0.268	0.069	0.099	0.119	0.233	0.397	0.250	0.232
-14.4	2.028	1.883	2.045	1.985	2.187	1.984	2.027	2.066	2.028
-11.9	1.971	2.084	2.122	2.059	2.117	2.077	2.154	2.116	2.089
-9.3	2.199	2.145	2.192	2.178	2.006	2.052	2.243	2.100	2.131
-6.8	2.185	2.267	2.354	2.269	2.432	2.167	2.301	2.300	2.237
-4.3	2.440	2.604	2.325	2.456	2.436	2.393	2.486	2.438	2.375
-1.7	2.540	2.772	2.592	2.635	2.698	2.517	2.678	2.631	2.573
0.8	2.916	2.820	3.009	2.915	2.871	2.817	2.827	2.838	2.768
3.4	3.744	3.550	3.543	3.612	3.622	3.635	3.567	3.608	3.463
5.9	4.215	4.192	4.389	4.265	4.556	4.239	4.228	4.341	4.106
12.9	9.331	9.285	9.696	9.437	8.917	7.486	7.855	8.086	8.448
15.5	13.706	13.501	13.230	13.479	12.406	11.092	12.477	11.992	14.472
18.0	16.100	15.774	15.679	15.851	17.034	19.762	21.824	19.540	18.725
20.5	21.745	18.434	19.886	20.021	25.464	25.157	22.496	24.372	23.679
23.1	30.083	30.202	28.301	29.529	24.878	24.128	20.207	23.071	26.300
25.6	34.830	37.668	33.057	35.185	24.291	23.140	20.042	22.491	27.784
28.2	30.710	30.759	29.890	30.453	24.842	24.931	25.076	24.949	26.952
30.7	28.794	27.559	28.226	28.193	26.784	24.201	27.655	26.213	26.024
33.2	32.956	31.679	32.010	32.215	32.898	26.142	27.123	28.721	33.849
35.8	35.907	35.343	34.335	35.195	35.438	37.636	38.144	37.073	36.893
38.3	33.683	32.863	31.945	32.830	32.273	36.613	34.511	34.466	33.649
40.9	32.012	30.859	31.093	31.321	30.671	29.788	29.340	29.933	31.843
43.4	31.395	32.910	32.677	32.327	32.133	30.114	28.178	30.142	31.611
45.9	30.631	30.753	30.936	30.773	31.805	33.015	37.017	33.946	32.200
48.5	31.566	31.540	31.910	31.672	32.720	34.179	36.188	34.362	32.736
51.0	32.977	32.248	32.141	32.456	34.830	35.810	35.159	35.266	33.389
53.6	35.195	36.186	35.929	35.770	35.812	35.565	35.597	35.658	35.894
56.1	33.659	33.640	34.699	33.999	33.838	34.652	34.864	34.451	34.864
58.6	32.632	32.613	32.799	32.681	32.979	33.811	33.811	33.534	33.407
61.2	31.085	31.253	31.374	31.237	32.471	32.994	33.375	32.946	32.592
69.3	33.038	32.034	31.734	32.269	35.357	38.031	39.255	37.548	37.113
71.8	39.131	39.770	37.683	38.861	40.767	44.124	44.386	43.092	41.372
74.4	41.807	40.374	43.388	41.856	43.982	42.813	42.867	43.221	43.120
76.9	49.297	48.901	46.118	48.105	42.849	42.933	41.564	42.449	44.361
79.4	44.692	48.781	46.736	46.736	42.948	41.336	40.978	41.754	43.027
82.0	42.291	42.522	42.151	42.321	41.749	41.198	40.767	41.238	41.472
84.5	41.527	41.217	41.166	41.303	41.542	41.585	40.536	41.221	40.922
87.1	40.761	40.958	40.865	40.861	41.150	40.891	39.909	40.650	40.461
89.6	40.165	40.054	40.386	40.202	40.538	40.396	39.654	40.196	39.808

RUN NUMBER 2 BUNDLE B-5 REYNOLDS NO. 5.53E+04
AVERAGE FLOW RATE: 0.0205 M**3/SEC. AVERAGE TEMPERATE 49.8 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE	TAP NUMBER 10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.039	0.009	0.084	0.044	0.112	-0.074	-0.077	-0.013	-0.005
-22.9	0.320	0.443	0.175	0.313	0.394	0.198	0.207	0.266	0.232
-14.4	2.035	2.147	1.999	2.060	2.072	1.860	2.069	2.001	2.028
-11.9	2.078	1.928	2.178	2.061	2.178	2.141	2.037	2.119	2.089
-9.3	2.072	2.144	2.021	2.079	2.195	2.197	2.106	2.166	2.131
-6.8	2.121	2.100	2.245	2.155	2.195	2.232	2.249	2.225	2.237
-4.3	2.300	2.513	2.242	2.352	2.242	2.202	2.316	2.253	2.375
-1.7	2.527	2.378	2.413	2.439	2.533	2.680	2.547	2.586	2.573
0.8	2.741	2.671	2.589	2.667	2.568	2.673	2.712	2.651	2.768
3.4	3.387	3.235	3.333	3.318	3.170	3.433	3.332	3.312	3.463
5.9	3.897	3.832	3.796	3.842	3.894	3.997	4.033	3.975	4.106
12.9	7.815	8.024	7.364	7.735	7.849	8.170	9.587	8.535	8.448
15.5	12.379	12.273	12.137	12.263	19.775	21.839	18.849	20.154	14.472
18.0	16.941	15.761	19.952	17.551	23.248	21.558	21.071	21.959	18.725
20.5	21.591	23.673	27.923	24.396	29.097	24.876	23.804	25.926	23.679
23.1	21.147	24.369	27.267	24.261	28.988	29.626	26.405	28.340	26.300
25.6	19.910	22.580	27.888	23.459	27.699	31.566	30.740	30.002	27.784
28.2	18.445	17.735	25.535	20.572	32.104	31.681	31.722	31.836	26.952
30.7	15.905	17.946	28.902	20.918	29.826	29.206	27.289	28.773	26.024
33.2	39.994	41.907	43.283	41.728	30.783	31.541	35.873	32.732	33.849
35.8	36.867	41.583	39.549	39.333	34.564	35.032	38.314	35.970	36.893
38.3	36.428	34.385	33.221	34.678	32.253	32.704	32.913	32.623	33.649
40.9	34.613	34.571	33.782	34.322	32.058	31.663	31.659	31.794	31.843
43.4	33.111	33.884	34.014	33.670	31.650	29.934	29.330	30.305	31.611
45.9	33.967	33.610	33.360	33.646	31.942	30.352	29.013	30.435	32.200
48.5	34.503	33.614	32.758	33.625	32.287	31.028	30.532	31.282	32.736
51.0	34.822	34.891	33.908	34.540	32.229	30.161	31.498	31.296	33.389
53.6	35.529	36.832	36.004	36.122	34.976	36.989	36.115	36.027	35.894
56.1	34.947	34.678	34.648	34.757	35.509	36.386	36.856	36.250	34.864
58.6	34.036	33.833	33.947	33.938	34.298	33.121	33.008	33.475	33.407
61.2	33.848	33.927	33.576	33.784	32.954	32.565	31.683	32.401	32.592
69.3	39.681	40.016	39.629	39.775	39.666	39.754	37.156	38.859	37.113
71.8	41.717	40.953	41.845	41.505	42.162	42.673	41.258	42.031	41.372
74.4	42.180	42.552	42.914	42.549	42.789	44.013	47.756	44.853	43.120
76.9	42.251	43.092	42.615	42.652	42.647	43.632	46.433	44.238	44.361
79.4	41.126	41.515	41.305	41.315	41.760	42.389	42.758	42.302	43.027
82.0	41.035	40.725	41.174	40.978	40.813	41.134	42.100	41.349	41.472
84.5	40.716	40.708	40.541	40.655	40.354	40.286	40.882	40.507	40.922
87.1	40.141	39.943	39.954	40.013	40.350	40.174	40.430	40.318	40.461
89.6	39.317	39.343	39.393	39.351	39.123	39.412	39.920	39.485	39.808

RUN NUMBER: 3 BUNDLE: B-5 REYNOLDS NO. 1.01E+05
AVERAGE FLOW RATE: 0.0375 M**3/SEC. AVERAGE TEMPERATE: 49.6 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.139	-0.031	0.097	-0.025	0.312	0.349	0.372	0.344	0.222
-22.9	0.274	0.400	0.556	0.410	0.721	1.078	1.252	1.017	0.928
-14.4	6.784	7.061	6.962	6.936	7.446	7.206	7.064	7.239	7.166
-11.9	7.379	7.443	7.305	7.376	7.316	7.290	7.473	7.360	7.403
-9.3	7.687	7.879	7.822	7.796	8.017	7.752	7.708	7.826	7.895
-6.8	8.166	8.199	8.327	8.231	8.954	8.186	8.422	8.521	8.256
-4.3	8.499	8.580	8.678	8.586	8.705	8.624	8.499	8.610	8.466
-1.7	9.092	9.196	9.143	9.144	9.282	8.847	8.905	9.011	8.885
0.8	9.903	10.017	10.198	10.039	10.198	9.644	9.836	9.893	9.671
3.4	12.355	12.368	12.286	12.336	12.570	12.061	12.281	12.304	11.969
5.9	14.535	14.458	14.951	14.648	14.952	14.562	14.165	14.560	14.005
12.9	29.698	29.814	31.165	30.226	29.319	25.517	25.891	26.909	27.464
15.5	43.451	42.652	42.094	42.732	40.278	35.906	40.232	38.805	46.492
18.0	50.743	49.229	49.386	49.786	54.763	65.820	70.325	63.636	59.900
20.5	67.466	58.363	63.411	63.080	84.101	82.692	73.346	80.046	75.664
23.1	97.950	97.257	90.712	95.306	80.367	78.302	65.437	74.702	85.074
25.6	113.736	124.328	106.860	114.975	79.521	73.537	63.772	72.276	90.253
28.2	97.928	98.303	95.694	97.308	80.694	80.557	79.438	80.230	86.865
30.7	90.464	87.852	90.292	89.536	85.561	76.669	87.305	83.178	83.532
33.2	104.506	100.613	102.584	102.568	104.775	80.910	84.366	90.017	106.909
35.8	114.220	113.864	110.621	112.902	113.754	123.085	123.658	120.166	119.097
38.3	106.805	105.255	101.929	104.663	102.508	118.996	111.571	111.025	107.498
40.9	103.334	99.183	99.308	100.608	97.432	95.412	94.268	95.704	101.429
43.4	101.099	104.977	104.352	103.476	103.054	95.135	88.284	95.591	100.602
45.9	98.423	98.126	98.697	98.415	101.510	104.630	117.143	107.761	102.536
48.5	101.411	100.731	102.124	101.422	104.003	109.069	114.554	109.209	104.262
51.0	105.471	102.802	102.368	103.547	110.163	114.045	111.517	111.908	106.045
53.6	111.615	115.353	114.034	113.667	113.577	113.197	113.989	113.588	114.506
56.1	106.872	106.747	109.777	107.799	107.598	109.679	110.587	109.288	110.524
58.6	103.659	102.889	103.150	103.233	104.823	106.305	107.003	106.044	105.532
61.2	98.172	98.681	99.523	98.792	101.955	104.304	105.011	103.757	102.782
69.3	104.036	100.840	99.425	101.434	111.477	119.807	123.801	118.362	117.086
71.8	122.906	126.167	117.961	122.345	128.850	139.165	139.416	135.810	130.456
74.4	132.879	128.315	137.168	132.787	138.257	134.220	134.653	135.710	136.277
76.9	156.820	154.726	145.752	152.433	135.722	135.422	130.054	133.733	139.877
79.4	140.186	152.575	148.433	147.065	135.549	129.667	128.992	131.403	134.897
82.0	131.825	133.256	132.743	132.608	131.098	128.881	127.839	129.273	129.868
84.5	129.418	129.253	127.922	128.864	129.683	129.325	126.958	128.655	127.654
87.1	127.001	127.925	127.495	127.474	128.724	127.644	125.317	127.229	126.414
89.6	124.753	125.338	125.645	125.245	126.594	125.848	122.965	125.135	123.968

RUN NUMBER: 3 BUNDLE: B-5 REYNOLDS NO. 1.01E+05
AVERAGE FLOW RATE: 0.0375 M**3/SEC. AVERAGE TEMPERATE: 49.6 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE		10	TAP NUMBER 11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.384	0.317	0.321	0.341	-	0.472	0.201	0.010	0.228	0.222
-22.9	1.400	1.365	1.125	1.297	-	1.465	0.908	0.594	0.989	0.928
-14.4	7.192	7.417	7.238	7.282	-	7.229	7.399	6.997	7.208	7.166
-11.9	7.460	7.337	7.429	7.409	-	7.498	7.540	7.364	7.467	7.403
-9.3	7.766	7.827	7.858	7.817	-	8.559	7.853	8.011	8.141	7.895
-6.8	8.149	8.155	8.041	8.115	-	7.997	8.042	8.429	8.156	8.256
-4.3	8.325	8.274	8.230	8.276	-	8.248	8.365	8.567	8.393	8.466
-1.7	8.658	8.553	8.492	8.567	-	8.522	8.842	9.094	8.819	8.885
0.8	9.759	9.393	9.149	9.433	-	9.129	9.239	9.586	9.318	9.671
3.4	11.764	11.528	11.405	11.566	-	11.391	11.847	11.776	11.671	11.969
5.9	13.445	13.295	13.155	13.298	-	13.227	13.423	13.886	13.512	14.005
12.9	26.047	26.618	24.501	25.722	-	24.673	25.956	30.364	26.998	27.464
15.5	39.884	40.219	39.341	39.815	-	63.925	70.654	59.269	64.616	46.492
18.0	55.125	51.317	61.981	56.141	-	73.911	69.515	66.683	70.036	59.900
20.5	69.169	75.274	88.862	77.768	-	94.421	75.256	75.604	81.760	75.664
23.1	69.538	79.982	85.847	78.456	-	93.317	96.561	85.612	91.830	85.074
25.6	66.543	73.336	90.053	76.644	-	88.865	103.029	99.459	97.118	90.253
28.2	59.000	58.981	81.037	66.339	-	104.742	102.683	103.321	103.582	86.865
30.7	59.024	58.976	89.772	69.257	-	96.027	94.127	86.310	92.155	83.532
33.2	123.696	126.919	140.728	130.447	-	99.053	101.790	112.965	104.603	106.909
35.8	118.607	134.038	127.853	126.833	-	111.486	113.484	124.492	116.487	119.097
38.3	116.533	107.050	106.379	109.987	-	103.459	104.449	105.042	104.317	107.498
40.9	109.346	106.705	107.644	107.898	-	102.753	101.102	100.658	101.504	101.429
43.4	104.291	107.928	107.651	106.623	-	100.393	96.052	93.713	96.719	100.602
45.9	107.008	106.556	105.362	106.308	-	102.245	97.487	93.243	97.658	102.536
48.5	108.995	105.311	104.261	106.189	-	103.361	99.660	97.661	100.227	104.262
51.0	110.444	110.783	107.011	109.413	-	102.329	96.312	99.290	99.311	106.045
53.6	113.233	119.436	115.394	116.021	-	111.143	117.909	115.187	114.746	114.506
56.1	110.448	109.170	109.453	109.690	-	112.235	116.029	117.697	115.320	110.524
58.6	107.328	106.360	106.881	106.857	-	108.073	105.187	104.728	105.996	105.532
61.2	106.605	106.358	105.770	106.244	-	104.580	102.765	99.661	102.335	102.782
69.3	125.546	126.614	125.771	125.977	-	125.878	125.102	116.729	122.570	117.086
71.8	131.242	128.705	131.858	130.602	-	133.381	135.479	130.343	133.068	130.456
74.4	133.747	134.385	135.329	134.487	-	134.745	139.288	152.335	142.123	136.277
76.9	132.375	135.456	133.809	133.880	-	133.845	136.855	147.692	139.464	139.877
79.4	127.369	129.857	129.133	128.786	-	130.885	132.660	133.454	132.333	134.897
82.0	129.878	127.096	128.023	128.332	-	127.915	129.102	130.764	129.260	129.868
84.5	126.510	126.853	126.544	126.636	-	126.012	125.863	127.504	126.460	127.654
87.1	124.918	125.203	125.034	125.052	-	125.368	125.893	126.447	125.903	126.414
89.6	122.710	122.607	122.122	122.480	-	121.880	123.067	124.084	123.010	123.968

RUN NUMBER: 4 BUNDLE: B-5 REYNOLDS NO. 3.19E+04
AVERAGE FLOW RATE: 0.0119 M**3/SEC. AVERAGE TEMPERATE: 49.4 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.004	-0.025	0.000	-0.007	0.024	0.035	0.043	0.034	0.023
-22.9	0.041	0.010	0.051	0.034	0.091	0.110	0.130	0.110	0.089
-14.4	0.725	0.748	0.737	0.737	0.784	0.740	0.747	0.757	0.755
-11.9	0.749	0.786	0.762	0.766	0.787	0.774	0.789	0.783	0.780
-9.3	0.813	0.808	0.779	0.800	0.821	0.788	0.787	0.798	0.806
-6.8	0.863	0.846	0.859	0.856	0.916	0.842	0.865	0.874	0.857
-4.3	0.883	0.904	0.892	0.893	0.896	0.903	0.899	0.900	0.883
-1.7	0.955	0.963	0.961	0.960	0.980	0.948	0.935	0.954	0.935
0.8	1.042	1.069	1.083	1.065	1.064	1.009	1.016	1.030	1.019
3.4	1.319	1.325	1.321	1.321	1.344	1.285	1.296	1.308	1.270
5.9	1.526	1.552	1.594	1.558	1.596	1.531	1.494	1.540	1.484
12.9	3.200	3.220	3.317	3.246	3.102	2.719	2.784	2.868	2.971
15.5	4.681	4.621	4.514	4.606	4.267	3.823	4.275	4.122	4.958
18.0	5.450	5.248	5.237	5.312	5.824	7.151	7.405	6.793	6.377
20.5	7.251	6.313	6.738	6.767	8.831	8.707	7.796	8.445	8.043
23.1	10.449	10.318	9.640	10.136	8.669	8.557	7.019	8.082	9.097
25.6	12.170	13.055	11.517	12.247	8.718	8.108	7.071	7.966	9.739
28.2	10.741	10.763	10.436	10.646	8.901	8.865	8.912	8.893	9.502
30.7	10.080	9.755	9.946	9.927	9.439	8.620	9.752	9.270	9.225
33.2	11.570	11.167	11.259	11.332	11.505	9.136	9.689	10.110	11.744
35.8	12.611	12.533	12.205	12.450	12.530	13.330	13.732	13.197	13.043
38.3	11.986	11.673	11.352	11.671	11.485	13.208	12.376	12.356	11.917
40.9	11.535	11.170	11.113	11.273	10.980	10.850	10.640	10.823	11.349
43.4	11.344	11.812	11.698	11.618	11.618	10.875	10.186	10.893	11.354
45.9	11.107	11.104	11.157	11.123	11.476	11.809	13.168	12.151	11.583
48.5	11.434	11.423	11.574	11.477	11.814	12.305	12.906	12.342	11.794
51.0	11.937	11.656	11.626	11.740	12.496	12.878	12.640	12.671	12.014
53.6	12.634	13.021	12.920	12.858	12.914	12.795	12.843	12.851	12.915
56.1	12.183	12.204	12.514	12.300	12.304	12.512	12.592	12.469	12.575
58.6	11.906	11.814	11.838	11.853	12.013	12.165	12.270	12.149	12.101
61.2	11.379	11.419	11.481	11.426	11.715	12.023	12.091	11.943	11.848
69.3	12.089	11.755	11.639	11.828	12.877	13.835	14.219	13.644	13.488
71.8	14.142	14.361	13.598	14.033	14.811	15.854	15.841	15.502	14.920
74.4	15.121	14.657	15.569	15.116	15.827	15.483	15.419	15.576	15.507
76.9	17.489	17.249	16.403	17.047	15.511	15.503	14.978	15.331	15.887
79.4	15.978	17.148	16.663	16.596	15.550	14.995	14.893	15.146	15.483
82.0	15.335	15.399	15.304	15.346	15.112	14.968	14.799	14.960	15.026
84.5	15.051	14.994	14.915	14.987	15.009	15.004	14.720	14.911	14.822
87.1	14.791	14.842	14.839	14.824	14.958	14.828	14.580	14.789	14.707
89.6	14.578	14.634	14.629	14.613	14.735	14.660	14.373	14.590	14.470

RUN NUMBER: 4 BUNDLE: B-5 REYNOLDS NO. 3.19E+04
AVERAGE FLOW RATE: 0.0119 M**3/SEC AVERAGE TEMPERATE: 49.4 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE		10	TAP NUMBER 11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.039	0.032	0.035	0.035	-	0.038	0.031	0.022	0.030	0.023
-22.9	0.105	0.109	0.103	0.106	-	0.135	0.098	0.087	0.107	0.089
-14.4	0.775	0.780	0.763	0.773	-	0.756	0.770	0.735	0.754	0.755
-11.9	0.783	0.774	0.778	0.779	-	0.789	0.794	0.794	0.792	0.780
-9.3	0.792	0.809	0.789	0.796	-	0.864	0.803	0.817	0.828	0.806
-6.8	0.854	0.865	0.843	0.854	-	0.842	0.836	0.858	0.845	0.857
-4.3	0.860	0.860	0.856	0.859	-	0.863	0.874	0.909	0.882	0.883
-1.7	0.914	0.908	0.896	0.906	-	0.905	0.914	0.937	0.919	0.935
0.8	1.020	0.999	0.960	0.993	-	0.963	0.979	1.026	0.989	1.019
3.4	1.236	1.215	1.200	1.217	-	1.201	1.246	1.257	1.235	1.270
5.9	1.413	1.401	1.385	1.400	-	1.402	1.429	1.483	1.438	1.484
12.9	2.793	2.895	2.698	2.796	-	2.760	2.874	3.291	2.975	2.971
15.5	4.229	4.308	4.232	4.257	-	6.723	7.471	6.347	6.847	4.958
18.0	5.829	5.419	6.646	5.965	-	7.838	7.318	7.157	7.438	6.377
20.5	7.313	8.009	9.503	8.275	-	9.857	8.116	8.081	8.685	8.043
23.1	7.390	8.469	9.286	8.382	-	10.024	10.168	9.180	9.791	9.097
25.6	7.195	7.909	9.730	8.278	-	9.683	11.018	10.691	10.464	9.739
28.2	6.566	6.308	8.970	7.281	-	11.239	11.154	11.172	11.188	9.502
30.7	6.002	6.071	10.439	7.504	-	10.571	10.403	9.623	10.199	9.225
33.2	13.272	14.128	14.572	13.991	-	11.031	11.264	12.340	11.545	11.744
35.8	13.073	14.699	13.597	13.790	-	12.244	12.413	13.546	12.734	13.043
38.3	12.594	11.713	11.721	12.009	-	11.536	11.635	11.725	11.632	11.917
40.9	12.016	11.854	11.928	11.933	-	11.502	11.317	11.277	11.365	11.349
43.4	11.862	12.075	12.077	12.005	-	11.277	10.802	10.626	10.902	11.354
45.9	12.193	12.068	11.908	12.056	-	11.490	10.973	10.537	11.000	11.583
48.5	12.367	11.993	11.786	12.049	-	11.660	11.244	11.024	11.309	11.794
51.0	12.535	12.442	12.144	12.374	-	11.597	10.969	11.248	11.271	12.014
53.6	12.896	13.331	12.988	13.072	-	12.555	13.165	12.919	12.880	12.915
56.1	12.592	12.478	12.495	12.522	-	12.721	13.106	13.198	13.009	12.575
58.6	12.278	12.206	12.248	12.244	-	12.368	12.089	12.024	12.160	12.101
61.2	12.212	12.229	12.175	12.206	-	12.066	11.833	11.548	11.816	11.848
69.3	14.371	14.463	14.395	14.410	-	14.375	14.317	13.520	14.071	13.488
71.8	15.049	14.790	15.088	14.976	-	15.195	15.458	14.854	15.169	14.920
74.4	15.318	15.291	15.383	15.331	-	15.333	15.765	16.912	16.003	15.507
76.9	15.137	15.454	15.346	15.312	-	15.335	15.591	16.653	15.860	15.887
79.4	14.914	14.969	14.907	14.930	-	15.099	15.275	15.403	15.259	15.483
82.0	14.944	14.735	14.806	14.828	-	14.826	14.929	15.148	14.968	15.026
84.5	14.685	14.712	14.693	14.697	-	14.653	14.634	14.796	14.694	14.822
87.1	14.551	14.563	14.568	14.560	-	14.591	14.673	14.705	14.656	14.707
89.6	14.300	14.316	14.288	14.302	-	14.272	14.372	14.481	14.375	14.470

RUN NUMBER: 5 BUNDLE: B-5 REYNOLDS NO. 5.58E+04
AVERAGE FLOW RATE: 0.0207 M**3/SEC. AVERAGE TEMPERATE: 49.8 DEG. C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.003	-0.039	0.030	-0.002	-	0.133	0.145	0.185	0.154	0.108
-22.9	0.145	0.097	0.201	0.148	-	0.309	0.423	0.438	0.390	0.320
-14.4	2.175	2.234	2.235	2.215	-	2.328	2.270	2.237	2.278	2.260
-11.9	2.281	2.372	2.318	2.324	-	2.312	2.329	2.376	2.339	2.342
-9.3	2.463	2.446	2.440	2.450	-	2.497	2.420	2.422	2.446	2.464
-6.8	2.560	2.550	2.602	2.570	-	2.780	2.521	2.614	2.638	2.574
-4.3	2.675	2.689	2.740	2.701	-	2.726	2.707	2.650	2.694	2.650
-1.7	2.850	2.903	2.879	2.877	-	2.942	2.805	2.804	2.851	2.802
0.8	3.119	3.172	3.209	3.167	-	3.198	3.055	3.055	3.103	3.037
3.4	3.924	3.906	3.908	3.913	-	3.992	3.822	3.816	3.877	3.775
5.9	4.605	4.620	4.763	4.662	-	4.734	4.601	4.464	4.600	4.431
12.9	9.481	9.516	9.827	9.608	-	9.188	7.995	8.181	8.455	8.751
15.5	13.878	13.711	13.450	13.679	-	12.814	11.380	12.678	12.291	14.760
18.0	16.318	15.760	15.677	15.918	-	17.432	21.751	22.120	20.434	19.101
20.5	21.550	18.739	20.158	20.149	-	26.453	26.101	23.300	25.285	24.062
23.1	31.185	30.980	28.815	30.327	-	25.937	25.303	21.001	24.080	27.137
25.6	36.301	39.513	34.300	36.705	-	25.760	23.882	20.741	23.461	28.958
28.2	31.683	31.834	30.980	31.499	-	26.185	26.251	25.954	26.130	28.035
30.7	29.657	28.674	29.392	29.241	-	27.817	25.126	28.712	27.218	26.992
33.2	34.239	32.935	33.345	33.507	-	34.059	26.594	28.016	29.556	34.525
35.8	37.181	37.042	36.083	36.769	-	37.088	39.649	40.413	39.050	38.524
38.3	35.001	34.385	33.335	34.240	-	33.655	38.678	36.526	36.286	35.095
40.9	33.785	32.550	32.555	32.963	-	32.111	31.547	31.038	31.565	33.338
43.4	33.113	34.408	34.280	33.934	-	34.032	31.561	29.353	31.649	33.060
45.9	32.309	32.330	32.490	32.376	-	33.518	34.633	38.841	35.664	33.801
48.5	33.263	33.181	33.629	33.358	-	34.512	36.052	37.751	36.105	34.350
51.0	34.695	33.808	33.712	34.072	-	36.607	37.782	36.784	37.058	34.965
53.6	36.695	37.892	37.488	37.358	-	37.688	37.419	37.479	37.529	37.616
56.1	35.258	35.239	36.203	35.566	-	35.579	36.214	36.527	36.107	36.449
58.6	34.221	33.930	34.069	34.074	-	34.445	35.011	35.440	34.965	34.859
61.2	32.527	32.615	32.911	32.685	-	33.633	34.471	34.838	34.314	34.040
69.3	34.602	33.640	33.208	33.817	-	36.969	39.722	40.968	39.220	38.778
71.8	40.759	41.522	39.016	40.432	-	42.581	45.897	45.776	44.751	43.049
74.4	43.635	42.273	45.050	43.653	-	45.689	44.487	44.421	44.866	44.917
76.9	51.294	50.508	47.907	49.903	-	44.753	44.801	43.131	44.228	46.131
79.4	46.409	50.340	48.693	48.481	-	44.859	43.099	42.891	43.616	44.741
82.0	43.908	44.338	44.106	44.118	-	43.556	42.986	42.496	43.013	43.213
84.5	43.205	43.041	42.769	43.005	-	43.179	43.109	42.301	42.863	42.575
87.1	42.382	42.629	42.528	42.513	-	42.943	42.600	41.902	42.481	42.210
89.6	41.775	41.893	41.955	41.874	-	42.332	41.992	41.141	41.821	41.477

RUN NUMBER 5 BUNDLE: B-5 REYNOLDS NO. 5.58E+04
AVERAGE FLOW RATE: 0.0207 M**3/SEC. AVERAGE TEMPERATE: 49.8 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	TAP NUMBER 8	TAP NUMBER 9	SOUTH SIDE AVERAGE	TAP NUMBER 10	TAP NUMBER 11	TAP NUMBER 12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.160	0.149	0.162	0.157	0.184	0.112	0.068	0.121	0.108
-22.9	0.419	0.390	0.345	0.385	0.453	0.325	0.290	0.356	0.320
-14.4	2.246	2.328	2.282	2.285	2.282	2.315	2.190	2.262	2.260
-11.9	2.355	2.338	2.352	2.348	2.363	2.378	2.332	2.358	2.342
-9.3	2.422	2.444	2.457	2.441	2.648	2.446	2.464	2.519	2.464
-6.8	2.559	2.548	2.510	2.539	2.491	2.533	2.626	2.550	2.574
-4.3	2.615	2.588	2.586	2.596	2.589	2.594	2.638	2.607	2.650
-1.7	2.740	2.690	2.682	2.704	2.693	2.770	2.862	2.775	2.802
0.8	3.043	2.917	2.859	2.940	2.871	2.908	3.039	2.939	3.037
3.4	3.691	3.620	3.611	3.641	3.577	3.701	3.733	3.670	3.775
5.9	4.229	4.187	4.153	4.190	4.155	4.249	4.409	4.271	4.431
12.9	8.248	8.537	7.901	8.229	7.997	8.427	9.711	8.712	8.751
15.5	12.675	12.740	12.545	12.653	20.142	22.192	18.910	20.415	14.760
18.0	17.341	16.183	19.772	17.765	23.509	21.959	21.396	22.288	19.101
20.5	21.816	24.000	28.384	24.734	29.789	24.275	24.177	26.080	24.062
23.1	21.984	25.202	27.526	24.904	29.924	30.350	27.440	29.238	27.137
25.6	21.191	23.432	28.897	24.507	28.637	32.961	31.875	31.158	28.958
28.2	19.051	18.384	26.439	21.291	33.512	33.041	33.108	33.221	28.035
30.7	16.989	17.678	29.960	21.542	31.097	30.544	28.253	29.965	26.992
33.2	37.762	40.844	44.474	41.027	32.165	33.007	36.862	34.012	34.525
35.8	37.428	44.028	40.688	40.715	36.088	36.628	39.971	37.562	38.524
38.3	37.928	34.940	34.568	35.812	33.758	34.081	34.285	34.041	35.095
40.9	35.985	35.687	35.242	35.638	33.558	33.045	32.949	33.184	33.338
43.4	34.394	35.232	35.323	34.983	32.861	31.399	30.763	31.674	33.060
45.9	35.412	35.173	34.800	35.128	33.506	31.956	30.644	32.035	33.801
48.5	35.952	34.916	34.428	35.098	33.881	32.622	32.016	32.840	34.350
51.0	36.418	36.435	35.318	36.057	33.669	31.702	32.650	32.674	34.965
53.6	37.242	38.709	37.836	37.929	36.595	38.598	37.753	37.649	37.616
56.1	36.459	36.076	36.147	36.228	37.019	38.107	38.555	37.893	36.449
58.6	35.551	35.264	35.396	35.403	35.734	34.711	34.537	34.994	34.859
61.2	35.361	35.321	35.084	35.256	34.587	34.034	33.101	33.907	34.040
69.3	41.384	41.757	41.517	41.553	41.467	41.295	38.799	40.521	38.778
71.8	43.341	42.625	43.581	43.182	43.934	44.674	42.889	43.832	43.049
74.4	44.177	44.283	44.651	44.370	44.546	45.868	49.918	46.777	44.917
76.9	43.767	44.763	44.441	44.324	44.332	45.213	48.666	46.070	46.131
79.4	42.677	43.082	42.932	42.897	43.479	44.017	44.409	43.968	44.741
82.0	42.971	42.343	42.606	42.640	42.651	43.014	43.575	43.080	43.213
84.5	42.213	42.271	42.255	42.246	42.022	42.019	42.513	42.185	42.575
87.1	41.771	41.811	41.780	41.787	41.902	42.047	42.230	42.060	42.210
89.6	41.071	41.079	40.973	41.041	40.883	41.215	41.411	41.169	41.477

RUN NUMBER: 6 BUNDLE: B-5 REYNOLDS NO. 1.01E+05
AVERAGE FLOW RATE: 0.0376 M**3/SEC. AVERAGE TEMPERATE: 49.7 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.015	-0.044	0.195	0.055	0.506	0.575	0.626	0.569	0.411
-22.9	0.350	0.345	0.728	0.474	1.040	1.422	1.445	1.302	1.087
-14.4	6.934	7.233	7.006	7.058	7.438	7.224	7.071	7.244	7.199
-11.9	7.213	7.545	7.385	7.381	7.331	7.295	7.555	7.393	7.440
-9.3	7.585	7.719	7.646	7.650	7.877	7.595	7.577	7.683	7.738
-6.8	8.057	8.007	8.161	8.075	8.816	7.960	8.264	8.347	8.084
-4.3	8.323	8.377	8.500	8.400	8.586	8.444	8.341	8.457	8.283
-1.7	8.820	9.016	8.984	8.940	9.111	8.715	8.727	8.851	8.708
0.8	9.637	9.799	9.953	9.797	9.941	9.425	9.644	9.670	9.419
3.4	12.089	12.161	12.120	12.123	12.415	11.868	11.979	12.087	11.724
5.9	14.290	14.274	14.879	14.481	14.781	14.393	13.998	14.391	13.770
12.9	29.351	29.518	30.727	29.865	28.754	25.087	25.692	26.511	27.163
15.5	43.318	42.686	41.972	42.659	40.073	35.645	39.947	38.555	46.390
18.0	50.618	49.103	49.209	49.643	55.139	65.315	71.161	63.871	59.960
20.5	67.474	58.305	63.609	63.129	84.350	83.624	75.388	81.121	76.165
23.1	98.246	97.008	90.793	95.349	81.244	80.635	66.277	76.052	85.554
25.6	113.403	125.035	107.975	115.471	80.723	74.816	65.325	73.621	91.163
28.2	98.563	99.085	96.586	98.078	82.146	82.236	82.274	82.219	87.912
30.7	91.474	88.497	91.113	90.361	86.839	78.333	90.819	85.330	84.417
33.2	106.046	101.783	103.765	103.864	106.269	82.555	88.731	92.519	107.958
35.8	115.461	115.362	112.414	114.413	115.569	125.713	129.704	123.662	121.063
38.3	108.234	106.538	103.205	105.993	103.982	121.724	113.287	112.998	108.122
40.9	104.486	99.944	100.363	101.598	98.637	97.507	95.160	97.101	101.777
43.4	102.070	106.183	105.496	104.583	103.822	96.743	90.053	96.873	101.467
45.9	99.386	99.116	99.683	99.395	102.799	105.659	118.618	109.025	103.497
48.5	102.323	101.744	103.024	102.364	105.297	110.210	116.092	110.533	105.201
51.0	106.602	103.634	103.282	104.506	111.481	114.760	112.509	112.917	106.954
53.6	112.576	116.416	115.457	114.816	114.514	114.037	114.386	114.313	115.660
56.1	107.820	107.719	110.836	108.792	108.439	110.647	111.304	110.130	111.526
58.6	104.493	103.594	104.101	104.063	105.520	107.071	107.988	106.859	106.321
61.2	99.132	99.317	100.345	99.598	102.952	105.309	105.878	104.713	103.546
69.3	105.212	101.833	100.198	102.414	112.627	121.357	125.260	119.748	118.272
71.8	124.221	127.018	119.141	123.460	130.187	140.962	141.102	137.417	131.973
74.4	134.094	129.656	138.460	134.070	140.506	136.136	135.967	137.536	137.961
76.9	158.270	155.727	147.463	153.820	136.885	137.263	131.621	135.256	141.634
79.4	141.958	154.498	149.983	148.813	136.710	131.202	130.638	132.850	136.618
82.0	133.581	135.038	134.550	134.390	132.785	130.672	129.455	130.971	131.603
84.5	131.253	131.199	129.626	130.693	131.482	130.990	128.589	130.354	129.319
87.1	128.753	129.717	129.220	129.230	130.547	129.326	127.138	129.004	128.144
89.6	126.720	127.090	127.396	127.069	128.325	127.507	124.708	126.847	125.704

RUN NUMBER. 6 BUNDLE. B-5 REYNOLDS NO. 1.01E+05
AVERAGE FLOW RATE: 0.0376 M**3/SEC. AVERAGE TEMPERATE: 49.7 DEG. C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE	-	TAP NUMBER 10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.643	0.561	0.589	0.598	-	0.665	0.424	0.180	0.423	0.411
-22.9	1.460	1.444	1.191	1.365	-	1.579	1.091	0.946	1.205	1.087
-14.4	7.225	7.457	7.240	7.307	-	7.245	7.377	6.943	7.188	7.199
-11.9	7.490	7.368	7.456	7.438	-	7.602	7.626	7.418	7.549	7.440
-9.3	7.621	7.728	7.648	7.666	-	8.402	7.670	7.794	7.956	7.738
-6.8	8.010	7.977	7.832	7.940	-	7.804	7.874	8.243	7.974	8.084
-4.3	8.119	8.100	8.055	8.091	-	8.060	8.128	8.362	8.184	8.283
-1.7	8.511	8.391	8.337	8.413	-	8.363	8.657	8.860	8.627	8.708
0.8	9.550	9.179	8.849	9.193	-	8.836	8.934	9.278	9.016	9.419
3.4	11.510	11.266	11.156	11.311	-	11.090	11.525	11.513	11.376	11.724
5.9	13.182	13.054	12.909	13.049	-	12.886	13.123	13.474	13.161	13.770
12.9	26.041	26.687	24.334	25.687	-	24.276	25.652	29.841	26.590	27.163
15.5	40.217	40.534	39.309	40.020	-	63.870	70.076	59.032	64.326	46.390
18.0	55.418	51.768	61.905	56.364	-	74.580	68.509	66.794	69.961	59.960
20.5	70.473	76.237	89.591	78.767	-	94.143	75.335	75.454	81.644	76.165
23.1	70.366	81.212	86.209	79.262	-	93.539	95.637	85.480	91.552	85.554
25.6	68.730	74.705	90.527	77.987	-	89.206	103.421	100.090	97.573	91.163
28.2	61.598	59.285	81.344	67.409	-	105.100	103.014	103.715	103.943	87.912
30.7	59.311	59.277	89.669	69.419	-	96.300	94.579	86.798	92.559	84.417
33.2	121.699	129.816	138.832	130.115	-	99.336	102.232	114.436	105.335	107.958
35.8	125.549	134.133	127.456	129.046	-	111.897	114.060	125.437	117.131	121.063
38.3	113.424	105.768	106.237	108.477	-	103.859	105.216	105.990	105.022	108.122
40.9	107.337	104.950	106.832	106.373	-	102.939	101.739	101.426	102.035	101.777
43.4	105.494	108.009	107.701	107.068	-	100.856	96.857	94.314	97.342	101.467
45.9	108.438	107.330	105.781	107.183	-	102.791	98.330	94.036	98.385	103.497
48.5	110.104	105.897	104.761	106.921	-	104.017	100.440	98.499	100.985	105.201
51.0	111.556	111.389	107.879	110.274	-	103.143	97.080	100.137	100.120	106.954
53.6	115.464	120.217	116.814	117.498	-	112.108	119.357	116.568	116.011	115.660
56.1	111.914	110.253	110.356	110.841	-	113.244	117.119	118.665	116.343	111.526
58.6	107.721	107.063	107.787	107.523	-	109.039	106.044	105.430	106.838	106.321
61.2	106.500	106.902	106.539	106.647	-	105.587	103.666	100.424	103.226	103.546
69.3	126.936	127.736	127.019	127.230	-	127.016	126.227	117.841	123.694	118.272
71.8	133.447	130.461	133.467	132.458	-	134.990	137.229	131.455	134.558	131.973
74.4	135.549	136.093	136.962	136.201	-	136.595	141.119	154.390	144.035	137.961
76.9	134.259	137.371	136.176	135.935	-	135.598	138.784	150.191	141.524	141.634
79.4	129.265	131.560	131.053	130.626	-	132.601	134.445	135.500	134.182	136.618
82.0	131.760	128.866	129.749	130.125	-	129.589	130.751	132.439	130.927	131.603
84.5	128.217	128.512	128.130	128.286	-	127.564	127.363	128.902	127.943	129.319
87.1	126.529	126.969	126.682	126.727	-	127.082	127.641	128.121	127.615	128.144
89.6	124.300	124.343	123.854	124.166	-	123.692	124.729	125.788	124.736	125.704

RUN NUMBER: 7 BUNDLE: B-5 REYNOLDS NO 1.70E+05
AVERAGE FLOW RATE: 0.0636 M**3/SEC. AVERAGE TEMPERATE 49.3 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.027	-0.259	0.779	0.183	-	1.646	1.689	1.705	1.680	1.178
-22.9	0.465	0.550	2.556	1.190	-	3.039	3.856	3.873	3.590	2.910
-14.4	17.977	18.497	18.331	18.268	-	19.806	19.165	18.766	19.246	19.012
-11.9	18.938	19.847	19.433	19.406	-	19.313	19.321	20.035	19.556	20.079
-9.3	20.028	20.174	19.936	20.046	-	20.684	19.853	19.792	20.110	20.275
-6.8	21.121	20.929	21.293	21.114	-	23.574	20.834	21.846	22.085	21.165
-4.3	21.700	21.926	22.172	21.933	-	22.534	22.186	21.853	22.191	21.572
-1.7	23.052	23.555	23.338	23.315	-	23.984	22.573	22.918	23.158	22.640
0.8	25.232	25.628	26.013	25.624	-	26.083	24.727	25.486	25.432	24.552
3.4	31.670	32.075	31.937	31.894	-	32.852	31.484	32.022	32.119	30.861
5.9	36.980	37.618	39.409	38.002	-	39.393	38.764	37.134	38.430	36.254
12.9	76.940	76.958	79.161	77.686	-	74.795	67.148	68.332	70.092	69.948
15.5	110.691	109.056	108.071	109.273	-	104.316	96.395	107.107	102.606	120.606
18.0	128.870	123.571	124.994	125.812	-	140.624	161.887	183.725	162.079	154.820
20.5	173.082	147.546	163.535	161.388	-	221.074	218.310	195.399	211.594	197.708
23.1	247.790	253.004	239.228	246.674	-	210.880	213.950	174.319	199.716	224.333
25.6	311.084	340.411	288.781	313.425	-	214.528	197.068	172.488	194.695	245.019
28.2	260.481	263.777	256.462	260.240	-	219.070	219.004	215.702	217.925	233.951
30.7	241.481	235.223	241.607	239.437	-	229.901	208.410	235.534	224.615	218.677
33.2	282.599	273.514	278.521	278.211	-	280.495	212.206	228.138	240.279	283.851
35.8	311.959	313.233	304.157	309.783	-	310.378	313.543	327.704	317.208	322.700
38.3	291.383	286.702	277.433	285.173	-	279.206	327.991	299.893	302.363	291.103
40.9	281.901	269.838	270.025	273.921	-	262.104	261.968	254.670	259.581	273.369
43.4	276.410	287.488	285.090	282.996	-	278.561	259.571	238.306	258.813	273.410
45.9	270.675	268.521	269.493	269.563	-	277.199	283.465	310.298	290.321	279.413
48.5	279.337	277.143	280.845	279.108	-	286.323	299.880	318.149	301.450	286.811
51.0	290.391	282.897	281.009	284.766	-	306.229	316.164	308.865	310.419	292.584
53.6	306.227	317.114	314.453	312.598	-	314.709	312.611	313.440	313.586	315.477
56.1	293.377	292.287	301.765	295.810	-	295.486	301.427	304.133	300.349	302.920
58.6	284.605	281.030	281.252	282.296	-	284.910	289.461	293.040	289.137	288.565
61.2	270.567	270.865	270.321	270.584	-	276.447	283.343	286.008	281.932	281.306
69.3	284.319	274.701	269.196	276.072	-	303.108	329.296	340.876	324.427	321.465
71.8	325.334	333.883	318.704	325.974	-	352.801	389.503	390.356	377.553	358.751
74.4	360.418	345.930	373.068	359.805	-	387.173	374.071	373.972	378.405	377.230
76.9	432.271	419.428	401.710	417.803	-	375.298	376.655	360.083	370.679	386.860
79.4	385.994	419.472	408.422	404.629	-	375.992	358.503	356.686	363.727	372.665
82.0	362.725	373.398	371.970	369.364	-	366.954	358.750	355.298	360.334	361.866
84.5	358.539	360.084	359.291	359.305	-	361.723	360.265	353.442	358.477	355.621
87.1	353.515	357.016	357.570	356.034	-	357.829	354.686	348.590	353.702	352.016
89.6	349.125	349.856	350.109	349.697	-	352.192	349.620	340.699	347.504	345.039

RUN NUMBER: 7
AVERAGE FLOW RATE: 0.0636 M**3/SEC.

BUNDLE: B-5
AVERAGE TEMPERATE: 49.3 DEG C

REYNOLDS NO. 1.70E+05

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER			SOUTH SIDE AVERAGE	TAP NUMBER			WEST SIDE AVERAGE	BUNDLE AVERAGE
	7	8	9		10	11	12		
-25.4	1.807	1.639	1.654	1.700	1.898	1.211	0.331	1.147	1.178
-22.9	4.028	4.084	3.294	3.802	4.382	2.823	1.966	3.057	2.910
-14.4	19.028	19.814	19.189	19.344	19.226	19.653	18.686	19.188	19.012
-11.9	20.795	20.321	20.559	20.558	20.883	20.897	20.609	20.796	20.079
-9.3	20.032	20.048	20.003	20.028	21.971	20.111	20.668	20.917	20.275
-6.8	21.029	20.917	20.368	20.771	20.200	20.436	21.672	20.769	21.185
-4.3	21.196	21.014	20.864	21.024	20.765	20.963	21.695	21.141	21.572
-1.7	22.083	21.670	21.444	21.732	21.423	22.431	23.206	22.353	22.640
0.8	25.041	23.774	22.854	23.890	22.719	23.115	23.957	23.264	24.552
3.4	30.385	29.766	29.105	29.752	28.931	30.208	29.899	29.679	30.861
5.9	35.049	34.415	33.581	34.348	33.339	34.179	35.184	34.234	36.254
12.9	69.109	69.847	62.149	67.035	58.974	61.844	74.124	64.981	69.948
15.5	107.885	108.124	103.580	106.530	162.916	181.980	147.155	164.017	120.606
18.0	148.448	138.805	161.972	149.742	197.689	179.854	167.400	181.648	154.820
20.5	185.957	201.036	241.269	209.421	241.803	191.092	192.400	208.432	197.708
23.1	189.173	216.808	228.163	211.382	244.526	252.504	221.647	239.559	224.333
25.6	183.420	201.129	245.949	210.166	236.271	280.292	268.803	261.789	245.019
28.2	162.291	152.705	212.705	175.900	285.432	279.176	280.611	281.740	233.951
30.7	145.361	115.497	228.691	163.183	257.611	253.959	230.844	247.471	218.677
33.2	311.419	349.211	349.159	336.596	267.242	274.583	299.122	280.315	283.851
35.8	327.383	364.900	338.701	343.661	305.391	311.906	343.146	320.147	322.700
38.3	307.677	286.700	282.436	292.271	279.623	284.408	289.788	284.607	291.103
40.9	290.500	279.782	284.992	285.091	276.411	273.822	274.414	274.883	273.369
43.4	282.815	292.570	289.993	288.460	271.835	260.936	257.348	263.373	273.410
45.9	291.304	289.535	285.825	288.888	279.959	267.815	258.863	268.879	279.413
48.5	297.629	285.175	282.282	288.362	285.381	277.388	272.207	278.325	286.811
51.0	302.569	302.972	291.960	299.167	283.693	268.880	275.380	275.985	292.584
53.6	311.804	332.992	320.975	321.924	306.162	321.437	313.796	313.798	315.477
56.1	303.659	299.207	300.136	301.001	308.217	315.174	320.176	314.522	302.920
58.6	293.517	290.249	292.025	291.930	296.621	288.827	287.245	290.897	288.565
61.2	290.787	289.964	288.693	289.815	287.864	284.224	276.593	282.894	281.306
69.3	346.918	350.338	348.039	348.432	347.344	344.522	318.923	336.930	321.465
71.8	365.870	357.296	366.961	363.375	369.733	376.153	358.423	368.103	358.751
74.4	372.389	373.746	376.305	374.147	374.564	387.416	427.708	396.563	377.230
76.9	367.532	377.112	372.979	372.541	371.476	378.637	409.142	386.418	386.860
79.4	354.020	359.277	357.435	356.911	362.263	366.400	367.513	365.392	372.665
82.0	365.536	353.379	356.373	358.429	356.029	358.895	363.089	359.337	361.866
84.5	352.143	353.225	352.403	352.590	350.619	350.065	355.650	352.112	355.621
87.1	347.363	348.220	347.484	347.689	348.318	350.071	353.528	350.639	352.016
89.6	340.629	340.640	339.293	340.188	338.659	342.227	347.413	342.766	345.039

RUN NUMBER: 8 BUNDLE: B-5 REYNOLDS NO. 1.71E+05
AVERAGE FLOW RATE: 0.0631 M**3/SEC. AVERAGE TEMPERATE: 49.9 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.006	-0.096	0.590	0.162	-	1.420	1.438	1.439	1.432	0.924
-22.9	1.030	1.003	1.896	1.310	-	2.910	3.757	3.713	3.460	2.720
-14.4	17.540	18.038	17.727	17.768	-	19.220	18.569	18.177	18.655	18.466
-11.9	18.351	19.310	18.976	18.879	-	18.701	18.683	19.421	18.935	19.079
-9.3	19.446	19.654	19.457	19.519	-	20.215	19.399	19.367	19.660	19.821
-6.8	20.659	20.342	20.805	20.602	-	23.057	20.406	21.382	21.615	20.721
-4.3	21.091	21.342	21.690	21.374	-	22.059	21.758	21.440	21.753	21.119
-1.7	22.351	22.973	22.904	22.742	-	23.579	22.178	22.551	22.769	22.205
0.8	24.432	24.916	25.555	24.967	-	25.659	24.310	25.142	25.037	24.085
3.4	30.990	31.330	31.368	31.229	-	32.366	31.053	31.706	31.709	30.343
5.9	36.147	36.422	38.359	36.976	-	38.871	38.315	37.052	38.079	35.590
12.9	73.397	70.934	77.366	73.899	-	73.053	65.399	66.563	68.338	67.729
15.5	107.715	105.113	105.009	105.946	-	101.300	93.579	104.225	99.701	117.048
18.0	125.802	120.329	121.929	122.687	-	136.930	156.732	179.502	157.721	150.616
20.5	168.801	144.199	160.428	157.809	-	216.566	214.186	192.059	207.604	193.193
23.1	242.879	252.640	234.941	243.487	-	206.762	210.648	171.053	196.154	220.029
25.6	304.730	334.692	282.813	307.412	-	209.654	193.284	169.298	190.745	240.099
28.2	254.732	258.144	250.597	254.491	-	214.040	214.394	212.130	213.521	229.149
30.7	236.385	229.621	236.114	234.040	-	224.898	203.965	230.927	219.930	214.465
33.2	276.306	266.623	272.125	271.685	-	272.876	207.947	225.065	235.296	278.087
35.8	305.023	306.324	297.885	303.077	-	302.846	307.173	324.886	311.635	316.689
38.3	285.453	281.124	271.595	279.391	-	273.458	323.579	293.882	296.973	284.127
40.9	276.795	264.637	264.283	268.572	-	255.835	255.079	248.551	253.155	266.685
43.4	270.155	281.239	278.898	276.764	-	272.201	253.960	233.123	253.095	266.941
45.9	264.434	262.571	263.879	263.628	-	270.791	277.134	303.123	283.682	272.815
48.5	272.733	270.771	274.806	272.770	-	279.375	292.703	310.737	294.272	279.965
51.0	283.672	276.037	274.671	278.127	-	299.022	308.662	301.482	303.056	285.544
53.6	299.527	309.840	307.081	305.483	-	307.193	305.248	305.639	306.027	308.110
56.1	286.970	285.782	294.737	289.163	-	288.833	294.409	297.012	293.418	295.960
58.6	278.217	274.691	275.005	275.971	-	278.283	282.861	286.266	282.470	281.859
61.2	264.661	264.645	265.043	264.783	-	270.233	276.953	279.495	275.560	274.764
69.3	277.845	268.070	262.461	269.459	-	295.740	322.405	333.682	317.276	314.352
71.8	318.662	328.162	311.734	319.519	-	345.884	382.632	382.733	370.416	351.568
74.4	354.001	338.514	365.664	352.726	-	380.555	367.155	366.594	371.435	369.809
76.9	424.500	409.514	392.672	408.896	-	368.619	369.964	352.819	363.801	379.137
79.4	378.608	408.258	397.969	394.945	-	369.072	351.551	349.668	356.764	364.840
82.0	356.260	364.987	365.561	362.270	-	360.286	351.968	348.499	353.584	354.888
84.5	350.814	352.823	352.143	351.926	-	354.368	352.675	346.164	351.069	348.125
87.1	345.548	349.428	350.137	348.371	-	349.724	346.850	341.166	345.913	344.575
89.6	341.774	342.909	343.085	342.589	-	344.662	342.181	333.773	340.205	337.908

RUN NUMBER: B
AVERAGE FLOW RATE: 0.0631 M**3/SEC.

BUNDLE: B-5
AVERAGE TEMPERATE: 49.9 DEG. C

REYNOLDS NO. 1.71E+05

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	TAP NUMBER 8	TAP NUMBER 9	SOUTH SIDE AVERAGE	TAP NUMBER 10	TAP NUMBER 11	TAP NUMBER 12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	1.399	1.143	1.321	1.288	1.556	0.818	0.064	0.813	0.924
-22.9	3.618	3.377	2.950	3.315	4.115	2.431	1.838	2.795	2.720
-14.4	18.454	19.331	18.722	18.836	18.736	19.207	17.877	18.607	18.466
-11.9	19.338	18.982	19.166	19.162	19.461	19.531	19.024	19.339	19.079
-9.3	19.594	19.752	19.625	19.657	21.500	19.710	20.135	20.448	19.821
-6.8	20.629	20.504	19.974	20.369	19.796	20.022	21.072	20.296	20.721
-4.3	20.798	20.667	20.439	20.635	20.386	20.559	21.201	20.716	21.119
-1.7	21.756	21.424	21.069	21.416	21.025	22.046	22.606	21.892	22.205
0.8	24.719	23.463	22.405	23.529	22.254	22.636	23.529	22.806	24.085
3.4	30.067	29.318	28.592	29.326	28.332	29.677	29.310	29.107	30.343
5.9	34.781	33.804	32.866	33.817	32.655	33.457	34.355	33.489	35.590
12.9	67.601	68.527	60.650	65.593	57.279	60.118	71.856	63.084	67.729
15.5	104.989	105.167	100.411	103.522	158.701	176.589	141.771	159.020	117.048
18.0	145.161	135.239	159.440	146.613	190.572	173.607	162.145	175.441	150.616
20.5	182.236	196.223	234.115	204.191	236.876	185.539	187.082	203.166	193.193
23.1	185.244	212.112	222.846	206.734	238.612	246.545	216.069	233.742	220.029
25.6	181.134	197.231	240.695	206.353	230.799	273.975	262.884	255.886	240.099
28.2	160.345	149.575	208.854	172.925	279.145	272.950	274.874	275.659	229.149
30.7	142.649	120.366	223.733	162.249	251.145	248.003	225.779	241.642	214.465
33.2	308.559	340.921	343.991	331.157	260.473	268.539	293.614	274.209	278.087
35.8	332.722	353.959	329.546	338.742	297.992	305.004	336.908	313.301	316.689
38.3	295.202	278.617	275.083	282.967	272.730	277.519	281.285	277.178	284.127
40.9	281.171	271.057	277.758	276.662	269.684	267.405	267.968	268.352	266.685
43.4	275.831	284.345	282.455	280.877	265.593	254.763	250.730	257.029	266.941
45.9	284.465	282.292	278.717	281.824	272.990	261.288	252.101	262.126	272.815
48.5	290.570	278.315	275.303	281.396	278.421	270.531	265.316	271.423	279.965
51.0	295.451	295.424	284.811	291.895	276.466	262.089	268.745	269.100	285.544
53.6	305.456	324.378	313.498	314.444	298.568	313.782	307.105	306.485	308.110
56.1	297.322	292.347	293.141	294.270	301.135	307.441	312.386	306.987	295.960
58.6	286.242	283.393	285.335	284.990	289.657	282.191	280.163	284.004	281.859
61.2	283.117	282.906	281.819	282.614	280.885	277.749	269.666	276.100	274.764
69.3	339.311	342.518	340.475	340.768	340.030	337.230	312.457	329.906	314.352
71.8	358.104	349.875	359.287	355.755	362.142	368.367	351.239	360.582	351.568
74.4	365.011	366.336	368.803	366.717	366.980	379.373	418.725	388.360	369.809
76.9	360.259	369.561	365.341	365.053	363.797	370.979	401.623	378.800	379.137
79.4	346.449	352.195	350.554	349.733	354.993	359.110	359.654	357.919	364.840
82.0	359.369	346.541	349.497	351.809	348.866	351.353	355.448	351.889	354.888
84.5	344.819	345.823	344.812	345.151	343.186	342.497	347.374	344.352	348.125
87.1	340.233	340.963	340.308	340.501	341.444	343.076	346.018	343.513	344.575
89.6	333.705	333.807	332.282	333.265	331.465	335.295	339.960	335.573	337.908

RUN NUMBER: 9 BUNDLE: B-5 REYNOLDS NO. 1.74E+04
AVERAGE FLOW RATE: 0.0064 M**3/SEC. AVERAGE TEMPERATE: 50.0 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.013	0.024	0.005	0.014	-	0.056	0.012	0.008	0.026	0.020
-22.9	0.012	0.001	0.010	0.007	-	0.007	0.018	-0.021	0.001	0.018
-14.4	0.170	0.246	0.163	0.193	-	0.195	0.204	0.212	0.204	0.198
-11.9	0.194	0.300	0.211	0.235	-	0.214	0.210	0.206	0.210	0.218
-9.3	0.219	0.231	0.246	0.232	-	0.187	0.190	0.191	0.189	0.213
-6.8	0.321	0.285	0.255	0.287	-	0.243	0.246	0.250	0.246	0.247
-4.3	0.258	0.229	0.302	0.263	-	0.275	0.262	0.222	0.253	0.262
-1.7	0.278	0.275	0.260	0.271	-	0.262	0.247	0.292	0.267	0.279
0.8	0.341	0.330	0.327	0.333	-	0.311	0.350	0.260	0.307	0.306
3.4	0.459	0.368	0.405	0.410	-	0.397	0.387	0.337	0.374	0.383
5.9	0.440	0.508	0.479	0.476	-	0.464	0.424	0.400	0.429	0.436
12.9	0.896	0.914	0.971	0.927	-	0.936	0.830	0.850	0.872	0.875
15.5	1.356	1.355	1.289	1.334	-	1.153	1.067	1.212	1.144	1.408
18.0	1.542	1.552	1.537	1.543	-	1.681	1.890	2.101	1.891	1.816
20.5	2.076	1.816	1.898	1.930	-	2.562	2.646	2.236	2.481	2.319
23.1	2.944	3.006	2.803	2.918	-	2.505	2.449	2.102	2.352	2.635
25.6	3.534	3.759	3.304	3.532	-	2.479	2.329	2.010	2.273	2.783
28.2	3.114	2.996	2.937	3.016	-	2.560	2.570	2.511	2.547	2.707
30.7	2.919	2.851	2.869	2.880	-	2.712	2.564	2.829	2.702	2.699
33.2	3.374	3.227	3.218	3.273	-	3.220	2.677	2.794	2.897	3.389
35.8	3.721	3.677	3.542	3.646	-	3.591	3.821	3.886	3.766	3.786
38.3	3.451	3.405	3.319	3.392	-	3.331	3.752	3.554	3.546	3.456
40.9	3.318	3.257	3.289	3.288	-	3.205	3.165	3.079	3.150	3.341
43.4	3.321	3.408	3.454	3.394	-	3.394	3.185	3.043	3.207	3.348
45.9	3.287	3.292	3.308	3.296	-	3.369	3.478	3.889	3.579	3.412
48.5	3.327	3.325	3.449	3.367	-	3.473	3.644	3.797	3.638	3.487
51.0	3.547	3.399	3.489	3.478	-	3.706	3.760	3.759	3.742	3.564
53.6	3.729	3.887	3.708	3.774	-	3.827	3.780	3.828	3.811	3.813
56.1	3.580	3.632	3.692	3.635	-	3.717	3.739	3.720	3.725	3.732
58.6	3.546	3.509	3.519	3.525	-	3.601	3.612	3.659	3.624	3.613
61.2	3.387	3.392	3.431	3.404	-	3.480	3.589	3.601	3.557	3.528
69.3	3.599	3.516	3.488	3.534	-	3.830	4.146	4.254	4.077	4.033
71.8	4.178	4.182	3.983	4.115	-	4.450	4.778	4.767	4.665	4.443
74.4	4.492	4.314	4.582	4.463	-	4.708	4.646	4.565	4.640	4.643
76.9	5.353	5.089	4.898	5.113	-	4.638	4.676	4.603	4.639	4.774
79.4	4.793	5.112	4.924	4.943	-	4.656	4.511	4.491	4.553	4.663
82.0	4.648	4.656	4.712	4.672	-	4.605	4.529	4.460	4.531	4.557
84.5	4.536	4.532	4.546	4.538	-	4.571	4.548	4.453	4.524	4.490
87.1	4.488	4.526	4.535	4.516	-	4.500	4.489	4.345	4.444	4.468
89.6	4.344	4.449	4.448	4.413	-	4.492	4.446	4.343	4.427	4.389

RUN NUMBER: 9
AVERAGE FLOW RATE: 0.0064 M**3/SEC

BUNDLE: B-5
AVERAGE TEMPERATE: 50.0 DEG C

REYNOLDS NO. 1.74E+04

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER			SOUTH SIDE AVERAGE		TAP NUMBER		WEST SIDE AVERAGE	BUNDLE AVERAGE
	7	8	9		10	11	12		
-25.4	0.018	0.004	0.067	0.030	0.078	0.011	-0.061	0.009	0.020
-22.9	0.017	0.001	0.024	0.014	0.037	0.093	0.015	0.048	0.018
-14.4	0.170	0.214	0.224	0.203	0.202	0.199	0.181	0.194	0.198
-11.9	0.216	0.235	0.194	0.215	0.238	0.208	0.193	0.213	0.218
-9.3	0.214	0.218	0.202	0.211	0.230	0.226	0.209	0.222	0.213
-6.8	0.289	0.245	0.148	0.227	0.217	0.230	0.238	0.228	0.247
-4.3	0.245	0.216	0.254	0.238	0.308	0.333	0.238	0.293	0.262
-1.7	0.287	0.268	0.290	0.282	0.235	0.261	0.395	0.297	0.279
0.8	0.314	0.278	0.288	0.293	0.286	0.269	0.317	0.291	0.306
3.4	0.375	0.401	0.353	0.376	0.356	0.356	0.407	0.373	0.383
5.9	0.394	0.402	0.397	0.398	0.421	0.431	0.468	0.440	0.436
12.9	0.806	0.865	0.802	0.825	0.835	0.840	0.953	0.876	0.875
15.5	1.228	1.218	1.194	1.213	1.845	2.213	1.764	1.941	1.408
18.0	1.665	1.525	1.998	1.729	2.193	2.130	1.977	2.100	1.816
20.5	2.065	2.252	2.750	2.356	2.850	2.336	2.340	2.509	2.319
23.1	2.167	2.502	2.712	2.460	2.851	2.921	2.652	2.808	2.635
25.6	1.980	2.236	2.787	2.334	2.768	3.168	3.036	2.991	2.783
28.2	1.802	1.770	2.584	2.052	3.207	3.206	3.225	3.213	2.707
30.7	1.763	1.678	3.245	2.229	3.089	3.022	2.844	2.985	2.699
33.2	3.852	4.253	4.057	4.054	3.143	3.304	3.549	3.332	3.389
35.8	3.879	4.282	3.995	4.052	3.577	3.493	3.963	3.678	3.786
38.3	3.693	3.462	3.457	3.537	3.221	3.403	3.428	3.351	3.456
40.9	3.608	3.448	3.579	3.545	3.480	3.291	3.375	3.382	3.341
43.4	3.490	3.579	3.550	3.540	3.381	3.200	3.166	3.249	3.348
45.9	3.568	3.560	3.455	3.527	3.413	3.218	3.112	3.247	3.412
48.5	3.641	3.536	3.501	3.559	3.462	3.364	3.325	3.384	3.487
51.0	3.705	3.680	3.591	3.658	3.450	3.311	3.369	3.377	3.564
53.6	3.775	3.972	3.885	3.877	3.640	3.889	3.842	3.790	3.813
56.1	3.735	3.708	3.714	3.719	3.791	3.888	3.865	3.848	3.732
58.6	3.668	3.698	3.675	3.681	3.692	3.600	3.570	3.621	3.613
61.2	3.630	3.633	3.643	3.635	3.566	3.519	3.467	3.517	3.528
69.3	4.328	4.359	4.314	4.334	4.290	4.276	4.002	4.189	4.033
71.8	4.496	4.465	4.496	4.485	4.558	4.597	4.365	4.507	4.443
74.4	4.617	4.677	4.626	4.640	4.551	4.728	5.206	4.828	4.643
76.9	4.556	4.579	4.591	4.576	4.622	4.713	4.975	4.770	4.774
79.4	4.595	4.521	4.468	4.528	4.557	4.657	4.670	4.628	4.663
82.0	4.537	4.459	4.542	4.513	4.566	4.507	4.466	4.513	4.557
84.5	4.480	4.466	4.365	4.437	4.438	4.473	4.474	4.461	4.490
87.1	4.429	4.454	4.428	4.437	4.481	4.473	4.465	4.473	4.468
89.6	4.363	4.348	4.357	4.356	4.262	4.366	4.449	4.359	4.389

RUN NUMBER 10 BUNDLE B-5 REYNOLDS NO 1.74E+04
AVERAGE FLOW RATE: 0.0064 M**3/SEC. AVERAGE TEMPERATE: 50.0 DEG.C

TAP LOCATION. (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.021	0.009	0.000	0.010	-	0.027	-0.046	0.029	0.003	0.012
-22.9	0.013	0.031	-0.027	0.006	-	0.079	0.033	0.026	0.046	0.028
-14.4	0.215	0.217	0.207	0.213	-	0.188	0.197	0.216	0.200	0.211
-11.9	0.210	0.154	0.212	0.192	-	0.212	0.226	0.201	0.213	0.214
-9.3	0.262	0.217	0.210	0.230	-	0.123	0.253	0.238	0.204	0.223
-6.8	0.241	0.249	0.166	0.219	-	0.248	0.201	0.262	0.237	0.233
-4.3	0.262	0.296	0.267	0.275	-	0.262	0.267	0.260	0.263	0.269
-1.7	0.268	0.309	0.294	0.290	-	0.310	0.277	0.292	0.293	0.276
0.8	0.298	0.308	0.244	0.283	-	0.276	0.303	0.290	0.290	0.291
3.4	0.374	0.394	0.385	0.384	-	0.403	0.387	0.375	0.388	0.375
5.9	0.454	0.492	0.472	0.473	-	0.403	0.480	0.449	0.444	0.438
12.9	0.930	0.940	0.950	0.940	-	0.943	0.798	0.827	0.856	0.869
15.5	1.355	1.357	1.325	1.346	-	1.264	1.183	1.120	1.189	1.431
18.0	1.590	1.501	1.558	1.549	-	1.682	1.900	2.133	1.905	1.830
20.5	2.028	1.843	1.957	1.943	-	2.578	2.589	2.274	2.480	2.342
23.1	2.959	3.020	2.820	2.933	-	2.513	2.477	2.081	2.357	2.650
25.6	3.557	3.761	3.320	3.546	-	2.582	2.373	2.051	2.335	2.829
28.2	3.147	3.084	3.086	3.105	-	2.625	2.637	2.597	2.620	2.777
30.7	3.019	2.875	2.912	2.936	-	2.733	2.557	2.872	2.721	2.726
33.2	3.399	3.258	3.291	3.316	-	3.360	2.716	2.825	2.967	3.406
35.8	3.720	3.595	3.559	3.625	-	3.623	3.851	3.926	3.800	3.805
38.3	3.480	3.425	3.456	3.454	-	3.353	3.862	3.591	3.602	3.505
40.9	3.370	3.191	3.284	3.282	-	3.148	3.237	3.129	3.171	3.238
43.4	3.382	3.503	3.445	3.443	-	3.434	3.162	3.095	3.230	3.386
45.9	3.325	3.333	3.368	3.342	-	3.447	3.561	3.997	3.668	3.485
48.5	3.420	3.428	3.484	3.444	-	3.582	3.688	3.891	3.720	3.555
51.0	3.601	3.510	3.509	3.540	-	3.705	3.843	3.793	3.780	3.620
53.6	3.834	3.924	3.800	3.853	-	3.883	3.864	3.933	3.893	3.907
56.1	3.718	3.765	3.795	3.759	-	3.755	3.786	3.853	3.798	3.841
58.6	3.653	3.638	3.648	3.646	-	3.698	3.726	3.758	3.727	3.719
61.2	3.496	3.537	3.592	3.542	-	3.608	3.672	3.736	3.672	3.649
69.3	3.711	3.620	3.594	3.642	-	3.982	4.233	4.356	4.190	4.145
71.8	4.276	4.280	4.093	4.216	-	4.555	4.866	4.844	4.755	4.544
74.4	4.512	4.413	4.598	4.508	-	4.824	4.751	4.731	4.768	4.722
76.9	5.387	5.256	5.012	5.219	-	4.803	4.793	4.609	4.735	4.894
79.4	4.876	5.216	5.124	5.072	-	4.736	4.707	4.583	4.675	4.768
82.0	4.742	4.733	4.704	4.726	-	4.653	4.536	4.569	4.586	4.626
84.5	4.626	4.609	4.619	4.618	-	4.645	4.645	4.584	4.625	4.574
87.1	4.568	4.552	4.588	4.570	-	4.615	4.572	4.511	4.566	4.535
89.6	4.481	4.515	4.526	4.507	-	4.558	4.534	4.430	4.508	4.461

RUN NUMBER 10
AVERAGE FLOW RATE: 0.0064 M**3/SEC

BUNDLE B-5
AVERAGE TEMPERATE: 50.0 DEG.C

REYNOLDS NO 1.74E+04

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 7	TAP NUMBER 8	TAP NUMBER 9	SOUTH SIDE AVERAGE		TAP NUMBER 10	TAP NUMBER 11	TAP NUMBER 12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.020	0.019	0.035	0.024	-	0.013	0.013	0.007	0.011	0.012
-22.9	0.037	0.041	0.000	0.026	-	0.025	0.001	0.080	0.036	0.028
-14.4	0.222	0.242	0.208	0.224	-	0.237	0.207	0.179	0.208	0.211
-11.9	0.224	0.210	0.299	0.244	-	0.200	0.230	0.197	0.209	0.214
-9.3	0.230	0.256	0.195	0.227	-	0.252	0.197	0.243	0.231	0.223
-6.8	0.260	0.259	0.219	0.246	-	0.193	0.249	0.243	0.228	0.233
-4.3	0.288	0.294	0.262	0.281	-	0.255	0.265	0.247	0.256	0.269
-1.7	0.142	0.274	0.281	0.232	-	0.305	0.288	0.274	0.289	0.276
0.8	0.326	0.280	0.288	0.298	-	0.270	0.294	0.314	0.292	0.291
3.4	0.365	0.369	0.373	0.369	-	0.340	0.356	0.373	0.356	0.375
5.9	0.413	0.421	0.377	0.404	-	0.436	0.423	0.436	0.432	0.438
12.9	0.818	0.775	0.776	0.790	-	0.870	0.830	0.971	0.891	0.869
15.5	1.368	1.248	1.237	1.284	-	1.888	2.010	1.813	1.903	1.431
18.0	1.685	1.481	1.941	1.702	-	2.282	2.143	2.062	2.162	1.830
20.5	2.135	2.312	2.776	2.408	-	2.797	2.477	2.335	2.536	2.342
23.1	2.109	2.425	2.692	2.409	-	3.005	2.960	2.736	2.900	2.650
25.6	2.054	2.231	2.823	2.370	-	2.855	3.236	3.099	3.064	2.829
28.2	1.910	1.821	2.603	2.111	-	3.267	3.275	3.278	3.273	2.777
30.7	1.860	1.750	3.190	2.266	-	3.106	3.003	2.839	2.983	2.726
33.2	3.739	4.142	4.087	3.989	-	3.199	3.329	3.530	3.353	3.406
35.8	3.807	4.359	3.992	4.052	-	3.590	3.671	3.960	3.740	3.805
38.3	3.717	3.457	3.448	3.540	-	3.389	3.409	3.478	3.425	3.505
40.9	3.597	3.493	3.524	3.538	-	3.397	3.373	3.313	3.361	3.338
43.4	3.507	3.593	3.590	3.563	-	3.384	3.286	3.252	3.307	3.386
45.9	3.641	3.603	3.583	3.609	-	3.474	3.288	3.195	3.319	3.485
48.5	3.715	3.604	3.543	3.621	-	3.530	3.421	3.356	3.436	3.555
51.0	3.781	3.751	3.712	3.748	-	3.534	3.384	3.315	3.411	3.620
53.6	3.890	4.069	3.985	3.981	-	3.818	3.993	3.896	3.902	3.907
56.1	3.843	3.832	3.826	3.834	-	3.903	4.041	3.973	3.973	3.841
58.6	3.778	3.739	3.770	3.762	-	3.807	3.749	3.667	3.741	3.719
61.2	3.768	3.738	3.739	3.748	-	3.692	3.663	3.553	3.636	3.649
69.3	4.395	4.457	4.451	4.434	-	4.416	4.395	4.131	4.314	4.145
71.8	4.633	4.525	4.601	4.587	-	4.624	4.717	4.513	4.618	4.544
74.4	4.646	4.727	4.718	4.697	-	4.696	4.850	5.200	4.915	4.722
76.9	4.767	4.765	4.735	4.756	-	4.717	4.785	5.098	4.867	4.894
79.4	4.696	4.578	4.605	4.626	-	4.653	4.710	4.737	4.700	4.768
82.0	4.640	4.541	4.573	4.585	-	4.574	4.621	4.622	4.606	4.626
84.5	4.555	4.451	4.518	4.508	-	4.524	4.530	4.581	4.545	4.574
87.1	4.509	4.500	4.492	4.500	-	4.524	4.443	4.550	4.505	4.535
89.6	4.420	4.359	4.397	4.392	-	4.396	4.442	4.474	4.438	4.461

RUN NUMBER 11 BUNDLE B-5R REYNOLDS NO 1.76E+04
AVERAGE FLUW RATE: 0.0065 M**3/SEC AVERAGE TEMPERATE: 49.9 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.028	-0.004	0.038	0.002	-	0.010	-0.022	0.030	0.006	0.015
-22.9	0.011	0.004	0.089	0.035	-	0.014	0.040	0.030	0.028	0.033
-14.4	0.097	0.214	0.186	0.166	-	0.146	0.243	0.259	0.216	0.181
-11.9	0.190	0.168	0.204	0.187	-	0.226	0.197	0.207	0.210	0.193
-9.3	0.228	0.206	0.214	0.216	-	0.166	0.215	0.124	0.168	0.191
-6.8	0.221	0.289	0.228	0.246	-	0.163	0.184	0.234	0.194	0.243
-4.3	0.340	0.216	0.234	0.264	-	0.226	0.231	0.252	0.236	0.245
-1.7	0.144	0.195	0.206	0.182	-	0.257	0.289	0.348	0.298	0.238
0.8	0.175	0.163	0.150	0.163	-	0.161	0.126	0.175	0.154	0.155
3.4	0.120	0.169	0.215	0.168	-	0.190	0.165	0.197	0.184	0.172
5.9	0.194	0.211	0.203	0.203	-	0.213	0.249	0.220	0.227	0.216
12.9	0.358	0.353	0.449	0.386	-	0.381	0.358	0.385	0.375	0.376
15.5	0.375	0.365	0.384	0.375	-	0.253	0.327	0.376	0.319	0.369
18.0	0.404	0.378	0.421	0.401	-	0.394	0.411	0.384	0.396	0.398
20.5	0.410	0.411	0.407	0.409	-	0.420	0.363	0.484	0.422	0.416
23.1	0.506	0.519	0.387	0.470	-	0.404	0.412	0.407	0.408	0.413
25.6	0.542	0.430	0.529	0.500	-	0.472	0.530	0.519	0.507	0.504
28.2	0.516	0.596	0.451	0.521	-	0.535	0.528	0.491	0.518	0.525
30.7	0.588	0.562	0.579	0.576	-	0.550	0.434	0.545	0.510	0.550
33.2	0.627	0.495	0.559	0.561	-	0.555	0.646	0.563	0.588	0.582
35.8	0.673	0.747	0.693	0.704	-	0.729	0.694	0.601	0.675	0.680
38.3	0.675	0.694	0.680	0.683	-	0.540	0.632	0.684	0.619	0.658
40.9	0.680	0.619	0.676	0.659	-	0.667	0.651	0.663	0.660	0.663
43.4	0.683	0.690	0.655	0.676	-	0.810	0.709	0.656	0.725	0.682
45.9	0.698	0.680	0.690	0.689	-	0.710	0.715	0.689	0.705	0.695
48.5	0.733	0.746	0.725	0.735	-	0.702	0.689	0.716	0.702	0.731
51.0	0.758	0.724	0.736	0.740	-	0.758	0.703	0.732	0.731	0.731
53.6	0.770	0.740	0.735	0.749	-	0.734	0.761	0.746	0.747	0.733
56.1	0.878	0.794	0.767	0.813	-	0.857	0.807	0.787	0.817	0.802
58.6	0.837	0.812	0.800	0.817	-	0.852	0.878	0.824	0.851	0.824
61.2	0.812	0.826	0.846	0.828	-	0.841	0.882	0.840	0.854	0.821
69.3	0.939	0.988	1.043	0.990	-	1.013	0.974	1.008	0.998	0.999
71.8	0.968	0.917	0.972	0.952	-	0.897	0.930	0.968	0.932	0.933
74.4	0.984	0.961	1.001	0.982	-	1.019	0.956	0.956	0.977	0.982
76.9	1.027	0.943	0.976	0.982	-	0.961	1.019	0.972	0.984	1.006
79.4	0.997	1.008	1.113	1.039	-	0.904	1.052	1.014	0.990	1.003
82.0	1.019	1.005	0.994	1.006	-	1.045	1.062	1.038	1.048	1.021
84.5	1.134	1.060	0.952	1.049	-	0.932	1.083	1.019	1.012	1.025
87.1	1.032	1.077	1.123	1.077	-	1.040	1.055	1.105	1.067	1.072
89.6	1.075	1.156	0.944	1.058	-	1.091	0.990	1.050	1.043	1.046

RUN NUMBER 11 BUNDLE B-5R REYNOLDS NO 1.76E+04
AVERAGE FLOW RATE: 0.0065 M**3/SEC AVERAGE TEMPERATE: 49.9 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE		10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.001	0.034	0.036	0.023	-	0.052	0.012	0.022	0.029	0.015
-22.9	0.036	0.097	0.039	0.057	-	-0.043	0.027	0.053	0.012	0.033
-14.4	0.254	0.132	0.116	0.167	-	0.132	0.147	0.245	0.175	0.181
-11.9	0.253	0.176	0.168	0.199	-	0.126	0.209	0.192	0.176	0.193
-9.3	0.213	0.228	0.220	0.220	-	0.195	0.138	0.149	0.161	0.191
-6.8	0.316	0.279	0.206	0.267	-	0.204	0.271	0.320	0.265	0.243
-4.3	0.290	0.175	0.213	0.226	-	0.247	0.216	0.294	0.252	0.245
-1.7	0.244	0.274	0.261	0.260	-	0.287	0.193	0.163	0.214	0.238
0.8	0.162	0.113	0.163	0.146	-	0.123	0.170	0.176	0.156	0.155
3.4	0.181	0.098	0.230	0.170	-	0.122	0.169	0.204	0.165	0.172
5.9	0.213	0.198	0.209	0.207	-	0.287	0.203	0.199	0.229	0.216
12.9	0.412	0.350	0.382	0.381	-	0.363	0.371	0.347	0.360	0.376
15.5	0.378	0.419	0.378	0.392	-	0.327	0.453	0.388	0.389	0.369
18.0	0.386	0.319	0.379	0.361	-	0.377	0.436	0.493	0.436	0.398
20.5	0.378	0.461	0.370	0.403	-	0.418	0.420	0.472	0.437	0.418
23.1	0.427	0.395	0.366	0.396	-	0.388	0.330	0.419	0.379	0.413
25.6	0.535	0.544	0.435	0.505	-	0.537	0.442	0.535	0.505	0.504
28.2	0.526	0.438	0.533	0.499	-	0.544	0.540	0.596	0.560	0.525
30.7	0.567	0.520	0.570	0.552	-	0.450	0.615	0.617	0.561	0.550
33.2	0.618	0.631	0.524	0.591	-	0.565	0.562	0.646	0.591	0.582
35.8	0.632	0.682	0.706	0.673	-	0.627	0.726	0.654	0.669	0.680
38.3	0.595	0.660	0.747	0.667	-	0.663	0.678	0.647	0.663	0.658
40.9	0.646	0.667	0.678	0.664	-	0.704	0.653	0.649	0.669	0.663
43.4	0.667	0.693	0.676	0.679	-	0.653	0.627	0.666	0.649	0.682
45.9	0.705	0.637	0.700	0.680	-	0.700	0.712	0.701	0.704	0.695
48.5	0.713	0.721	0.784	0.739	-	0.700	0.793	0.749	0.748	0.731
51.0	0.737	0.778	0.741	0.752	-	0.798	0.650	0.656	0.701	0.731
53.6	0.734	0.731	0.655	0.707	-	0.729	0.694	0.768	0.731	0.733
56.1	0.833	0.803	0.754	0.797	-	0.811	0.799	0.729	0.780	0.802
58.6	0.825	0.821	0.807	0.818	-	0.826	0.796	0.814	0.812	0.824
61.2	0.829	0.828	0.769	0.809	-	0.848	0.773	0.758	0.793	0.821
69.3	1.009	0.956	1.004	0.990	-	1.026	1.053	0.973	1.017	0.999
71.8	0.878	0.993	0.950	0.940	-	0.839	0.941	0.949	0.910	0.933
74.4	0.950	1.055	0.968	0.991	-	0.965	0.996	0.969	0.977	0.982
76.9	1.059	1.024	1.030	1.038	-	1.007	0.991	1.063	1.020	1.006
79.4	0.971	1.083	0.985	1.013	-	0.998	0.926	0.983	0.969	1.003
82.0	1.067	0.945	1.021	1.011	-	1.034	1.032	0.993	1.020	1.021
84.5	1.078	0.914	1.025	1.006	-	1.024	1.052	1.027	1.034	1.025
87.1	0.994	1.091	1.098	1.061	-	1.042	1.135	1.074	1.084	1.072
89.6	1.100	0.962	1.036	1.033	-	1.051	1.074	1.021	1.048	1.046

RUN NUMBER: 12 BUNDLE: B-5R REYNOLDS NO. 3.25E+04
AVERAGE FLOW RATE: 0.0120 M**3/SEC. AVERAGE TEMPERATE: 50.1 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	2	3	NORTH SIDE AVERAGE		4	TAP NUMBER 5	6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.003	0.000	0.012	0.003	-	0.044	0.046	0.030	0.040	0.023
-22.9	0.028	0.047	0.091	0.055	-	0.113	0.139	0.130	0.127	0.090
-14.4	0.609	0.664	0.659	0.644	-	0.695	0.688	0.667	0.683	0.664
-11.9	0.692	0.700	0.694	0.696	-	0.712	0.716	0.718	0.715	0.706
-9.3	0.751	0.746	0.767	0.755	-	0.766	0.757	0.759	0.761	0.765
-6.8	0.806	0.784	0.800	0.797	-	0.849	0.806	0.825	0.827	0.808
-4.3	0.836	0.838	0.836	0.836	-	0.846	0.854	0.855	0.852	0.839
-1.7	0.871	0.898	0.864	0.877	-	0.902	0.896	0.910	0.902	0.888
0.8	0.921	0.927	0.919	0.922	-	0.953	0.941	0.946	0.947	0.930
3.4	0.961	0.962	0.967	0.963	-	0.977	0.986	1.004	0.989	0.976
5.9	1.000	1.007	1.044	1.017	-	1.056	1.072	1.063	1.064	1.038
12.9	1.552	1.574	1.596	1.574	-	1.604	1.620	1.609	1.611	1.590
15.5	1.617	1.617	1.602	1.612	-	1.607	1.606	1.633	1.615	1.612
18.0	1.660	1.636	1.646	1.647	-	1.658	1.640	1.657	1.652	1.653
20.5	1.670	1.702	1.702	1.691	-	1.697	1.669	1.685	1.684	1.690
23.1	1.737	1.736	1.718	1.730	-	1.745	1.727	1.745	1.739	1.732
25.6	1.799	1.811	1.810	1.806	-	1.785	1.776	1.790	1.783	1.788
28.2	1.816	1.831	1.827	1.825	-	1.837	1.833	1.822	1.831	1.832
30.7	1.862	1.876	1.865	1.868	-	1.887	1.862	1.876	1.875	1.868
33.2	1.886	1.913	1.911	1.903	-	1.919	1.905	1.922	1.915	1.908
35.8	1.929	1.939	1.936	1.935	-	1.939	1.936	1.945	1.940	1.939
38.3	1.968	1.980	1.986	1.978	-	1.985	1.975	1.968	1.976	1.981
40.9	2.015	2.039	2.029	2.028	-	2.017	2.019	2.019	2.018	2.026
43.4	2.059	2.056	2.067	2.061	-	2.051	2.060	2.049	2.053	2.060
45.9	2.101	2.102	2.110	2.104	-	2.109	2.113	2.096	2.106	2.107
48.5	2.159	2.167	2.166	2.164	-	2.136	2.145	2.163	2.148	2.154
51.0	2.183	2.192	2.195	2.190	-	2.195	2.189	2.195	2.193	2.184
53.6	2.214	2.239	2.248	2.234	-	2.224	2.225	2.245	2.231	2.229
56.1	2.251	2.263	2.277	2.263	-	2.266	2.287	2.274	2.276	2.268
58.6	2.309	2.289	2.310	2.303	-	2.335	2.348	2.342	2.342	2.319
61.2	2.366	2.381	2.400	2.382	-	2.426	2.439	2.455	2.440	2.403
69.3	2.900	2.896	2.925	2.907	-	2.928	2.930	2.930	2.930	2.914
71.8	2.951	2.956	2.967	2.958	-	2.966	2.970	2.971	2.969	2.960
74.4	2.996	2.996	3.012	3.001	-	3.010	3.005	3.005	3.007	3.000
76.9	3.036	3.052	3.044	3.044	-	3.044	3.062	3.031	3.045	3.041
79.4	3.083	3.078	3.069	3.077	-	3.099	3.091	3.071	3.087	3.078
82.0	3.113	3.136	3.143	3.131	-	3.134	3.130	3.131	3.132	3.139
84.5	3.171	3.200	3.181	3.184	-	3.166	3.187	3.171	3.174	3.175
87.1	3.198	3.240	3.249	3.229	-	3.236	3.223	3.218	3.226	3.218
89.6	3.262	3.263	3.267	3.264	-	3.312	3.297	3.297	3.302	3.272

RUN NUMBER: 12 BUNDLE: B-5R REYNOLDS NO. 3.25E+04
AVERAGE FLOW RATE: 0.0120 M**3/SEC. AVERAGE TEMPERATE: 50.1 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE	-	10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.045	0.024	0.027	0.032	-	0.033	0.009	0.007	0.016	0.023
-22.9	0.117	0.108	0.090	0.105	-	0.095	0.055	0.061	0.071	0.090
-14.4	0.667	0.676	0.682	0.675	-	0.662	0.668	0.628	0.653	0.664
-11.9	0.723	0.708	0.715	0.715	-	0.692	0.706	0.693	0.697	0.706
-9.3	0.773	0.767	0.752	0.764	-	0.818	0.748	0.770	0.779	0.765
-6.8	0.821	0.796	0.803	0.806	-	0.780	0.795	0.829	0.802	0.808
-4.3	0.830	0.835	0.834	0.833	-	0.840	0.832	0.836	0.836	0.839
-1.7	0.879	0.898	0.883	0.887	-	0.876	0.896	0.880	0.884	0.888
0.8	0.945	0.924	0.930	0.933	-	0.917	0.919	0.912	0.916	0.930
3.4	0.985	0.986	0.977	0.983	-	0.984	0.965	0.955	0.968	0.976
5.9	1.060	1.045	1.039	1.048	-	1.035	1.019	1.013	1.022	1.038
12.9	1.609	1.625	1.596	1.610	-	1.556	1.571	1.570	1.566	1.590
15.5	1.611	1.624	1.623	1.620	-	1.609	1.602	1.590	1.600	1.612
18.0	1.673	1.658	1.656	1.662	-	1.654	1.662	1.638	1.651	1.653
20.5	1.688	1.685	1.693	1.689	-	1.709	1.694	1.688	1.697	1.690
23.1	1.759	1.739	1.728	1.742	-	1.714	1.718	1.717	1.716	1.732
25.6	1.790	1.781	1.774	1.782	-	1.780	1.773	1.793	1.782	1.788
28.2	1.819	1.816	1.846	1.827	-	1.867	1.838	1.831	1.845	1.832
30.7	1.857	1.859	1.873	1.863	-	1.872	1.862	1.867	1.867	1.868
33.2	1.896	1.908	1.910	1.905	-	1.890	1.917	1.913	1.907	1.908
35.8	1.943	1.941	1.940	1.941	-	1.938	1.936	1.949	1.941	1.939
38.3	1.972	1.975	1.982	1.976	-	1.988	2.010	1.983	1.993	1.981
40.9	2.008	2.023	2.085	2.039	-	2.025	2.017	2.022	2.021	2.026
43.4	2.081	2.066	2.063	2.070	-	2.053	2.053	2.059	2.055	2.060
45.9	2.101	2.116	2.103	2.107	-	2.114	2.110	2.109	2.111	2.107
48.5	2.146	2.145	2.179	2.157	-	2.155	2.134	2.148	2.146	2.154
51.0	2.181	2.149	2.188	2.173	-	2.196	2.169	2.178	2.181	2.184
53.6	2.238	2.217	2.234	2.230	-	2.226	2.214	2.224	2.221	2.229
56.1	2.288	2.281	2.262	2.277	-	2.254	2.248	2.264	2.255	2.268
58.6	2.333	2.325	2.315	2.324	-	2.311	2.296	2.318	2.308	2.319
61.2	2.422	2.420	2.389	2.410	-	2.397	2.377	2.361	2.378	2.403
69.3	2.922	2.954	2.910	2.929	-	2.897	2.893	2.888	2.893	2.914
71.8	2.985	2.955	2.947	2.962	-	2.954	2.954	2.945	2.951	2.960
74.4	2.995	3.000	2.990	2.995	-	3.010	2.986	2.998	2.998	3.000
76.9	3.034	3.049	3.047	3.043	-	3.030	3.047	3.013	3.030	3.041
79.4	3.039	3.086	3.066	3.064	-	3.079	3.087	3.083	3.083	3.078
82.0	3.209	3.145	3.145	3.166	-	3.125	3.129	3.128	3.128	3.139
84.5	3.168	3.190	3.185	3.181	-	3.154	3.177	3.152	3.161	3.175
87.1	3.210	3.207	3.210	3.209	-	3.211	3.208	3.207	3.208	3.218
89.6	3.263	3.272	3.255	3.263	-	3.259	3.264	3.248	3.257	3.272

RUN NUMBER 13 BUNDLE B-5R REYNOLDS NO 5.56E+04
AVERAGE FLOW RATE 0.0207 M**3/SEC AVERAGE TEMPERATE 49.7 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	-	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.012	-0.006	0.046	0.017	-	0.105	0.099	0.132	0.112	0.075
-22.9	0.162	0.142	0.209	0.171	-	0.270	0.363	0.380	0.338	0.271
-14.4	1.815	1.917	1.969	1.900	-	2.085	1.999	1.986	2.023	1.957
-11.9	1.992	2.063	2.041	2.032	-	2.049	2.048	2.085	2.061	2.049
-9.3	2.179	2.161	2.181	2.174	-	2.224	2.167	2.168	2.186	2.199
-6.8	2.276	2.256	2.304	2.279	-	2.447	2.283	2.364	2.365	2.309
-4.3	2.372	2.379	2.394	2.382	-	2.407	2.432	2.429	2.423	2.390
-1.7	2.507	2.515	2.503	2.508	-	2.542	2.518	2.574	2.545	2.518
0.8	2.638	2.632	2.670	2.646	-	2.697	2.655	2.739	2.697	2.663
3.4	2.732	2.778	2.761	2.757	-	2.809	2.816	2.858	2.827	2.788
5.9	2.875	2.891	2.990	2.919	-	3.010	3.061	3.029	3.033	2.952
12.9	4.312	4.449	4.495	4.419	-	4.495	4.527	4.550	4.524	4.469
15.5	4.471	4.434	4.462	4.456	-	4.462	4.487	4.485	4.478	4.473
18.0	4.562	4.526	4.572	4.553	-	4.564	4.546	4.605	4.572	4.586
20.5	4.681	4.673	4.742	4.699	-	4.702	4.675	4.685	4.687	4.694
23.1	4.811	4.784	4.767	4.787	-	4.795	4.753	4.793	4.780	4.782
25.6	4.929	4.981	4.918	4.943	-	4.935	4.926	4.942	4.934	4.939
28.2	5.034	5.038	5.076	5.049	-	5.059	5.020	5.055	5.045	5.053
30.7	5.146	5.148	5.172	5.155	-	5.174	5.156	5.147	5.159	5.153
33.2	5.223	5.273	5.265	5.253	-	5.312	5.263	5.261	5.279	5.266
35.8	5.393	5.358	5.365	5.372	-	5.370	5.353	5.365	5.363	5.367
38.3	5.481	5.535	5.473	5.496	-	5.468	5.490	5.475	5.477	5.488
40.9	5.602	5.590	5.608	5.600	-	5.588	5.567	5.593	5.583	5.601
43.4	5.686	5.713	5.671	5.690	-	5.707	5.684	5.705	5.699	5.692
45.9	5.795	5.789	5.796	5.793	-	5.808	5.797	5.782	5.796	5.794
48.5	5.927	5.950	5.905	5.927	-	5.899	5.913	5.919	5.911	5.922
51.0	6.006	6.015	6.001	6.008	-	6.049	6.036	6.030	6.038	6.026
53.6	6.113	6.117	6.124	6.118	-	6.143	6.149	6.147	6.146	6.124
56.1	6.235	6.229	6.249	6.238	-	6.281	6.315	6.273	6.290	6.244
58.6	6.339	6.323	6.371	6.344	-	6.410	6.467	6.444	6.440	6.373
61.2	6.477	6.519	6.591	6.529	-	6.705	6.727	6.717	6.716	6.595
69.3	7.921	7.950	7.986	7.952	-	8.055	8.038	8.047	8.047	7.993
71.8	8.069	8.073	8.075	8.072	-	8.105	8.096	8.116	8.106	8.088
74.4	8.155	8.250	8.192	8.199	-	8.219	8.198	8.178	8.198	8.194
76.9	8.273	8.359	8.330	8.321	-	8.307	8.314	8.323	8.315	8.311
79.4	8.404	8.406	8.429	8.413	-	8.403	8.399	8.422	8.408	8.391
82.0	8.495	8.548	8.602	8.548	-	8.543	8.523	8.526	8.531	8.564
84.5	8.629	8.673	8.657	8.653	-	8.657	8.645	8.655	8.652	8.639
87.1	8.727	8.822	8.840	8.797	-	8.829	8.806	8.788	8.807	8.772
89.6	8.850	8.852	8.947	8.883	-	9.016	8.965	8.946	8.976	8.894

RUN NUMBER 13 BUNDLE B-5R REYNOLDS NO 5.56E+04
AVERAGE FLOW RATE 0.0207 M**3/SEC AVERAGE TEMPERATE 49.7 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE	-	TAP NUMBER 10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.128	0.107	0.090	0.108	-	0.104	0.045	0.038	0.062	0.075
-22.9	0.366	0.350	0.277	0.331	-	0.328	0.220	0.189	0.246	0.271
-14.4	2.003	2.043	1.955	2.000	-	1.922	1.931	1.853	1.902	1.957
-11.9	2.085	2.030	2.054	2.057	-	2.075	2.050	2.020	2.048	2.049
-9.3	2.204	2.188	2.199	2.197	-	2.366	2.171	2.182	2.240	2.199
-6.8	2.330	2.309	2.267	2.302	-	2.260	2.283	2.333	2.292	2.309
-4.3	2.395	2.379	2.378	2.384	-	2.371	2.352	2.395	2.373	2.390
-1.7	2.506	2.490	2.494	2.497	-	2.491	2.529	2.544	2.521	2.518
0.8	2.724	2.676	2.671	2.691	-	2.626	2.624	2.601	2.617	2.663
3.4	2.787	2.801	2.806	2.798	-	2.804	2.794	2.714	2.771	2.788
5.9	2.971	2.962	2.954	2.963	-	2.939	2.900	2.846	2.895	2.952
12.9	4.525	4.535	4.502	4.521	-	4.389	4.413	4.437	4.413	4.469
15.5	4.486	4.505	4.471	4.488	-	4.494	4.476	4.446	4.472	4.473
18.0	4.635	4.613	4.607	4.618	-	4.576	4.646	4.579	4.600	4.586
20.5	4.693	4.674	4.695	4.688	-	4.733	4.721	4.658	4.704	4.694
23.1	4.796	4.791	4.779	4.789	-	4.774	4.781	4.759	4.771	4.782
25.6	4.962	4.914	4.919	4.932	-	4.913	4.966	4.945	4.948	4.939
28.2	5.031	5.014	5.059	5.035	-	5.189	5.050	5.016	5.085	5.053
30.7	5.157	5.152	5.173	5.161	-	5.148	5.152	5.111	5.137	5.153
33.2	5.262	5.249	5.271	5.261	-	5.259	5.283	5.268	5.270	5.266
35.8	5.342	5.374	5.371	5.363	-	5.365	5.398	5.356	5.373	5.367
38.3	5.462	5.495	5.523	5.493	-	5.464	5.490	5.503	5.486	5.488
40.9	5.574	5.590	5.722	5.629	-	5.609	5.574	5.599	5.594	5.601
43.4	5.708	5.675	5.694	5.693	-	5.687	5.683	5.687	5.686	5.692
45.9	5.797	5.795	5.817	5.803	-	5.792	5.791	5.773	5.785	5.794
48.5	5.897	5.917	6.012	5.942	-	5.905	5.913	5.907	5.908	5.922
51.0	6.025	6.129	6.000	6.051	-	6.002	6.014	6.002	6.006	6.026
53.6	6.135	6.119	6.117	6.124	-	6.106	6.112	6.106	6.108	6.124
56.1	6.274	6.236	6.223	6.245	-	6.201	6.193	6.216	6.203	6.244
58.6	6.410	6.386	6.361	6.385	-	6.343	6.284	6.337	6.321	6.373
61.2	6.641	6.634	6.583	6.619	-	6.574	6.520	6.448	6.514	6.595
69.3	8.046	8.019	7.997	8.021	-	7.992	7.947	7.916	7.952	7.993
71.8	8.130	8.081	8.100	8.104	-	8.064	8.059	8.089	8.071	8.088
74.4	8.194	8.191	8.190	8.192	-	8.190	8.169	8.208	8.189	8.194
76.9	8.297	8.307	8.367	8.324	-	8.302	8.268	8.287	8.285	8.311
79.4	8.183	8.391	8.424	8.333	-	8.430	8.395	8.406	8.410	8.391
82.0	8.919	8.503	8.553	8.658	-	8.536	8.508	8.505	8.516	8.564
84.5	8.648	8.624	8.634	8.635	-	8.606	8.610	8.627	8.614	8.639
87.1	8.760	8.753	8.756	8.756	-	8.737	8.724	8.727	8.729	8.772
89.6	8.917	8.881	8.837	8.879	-	8.862	8.834	8.822	8.840	8.894

RUN NUMBER 14 BUNDLE B-5R REYNOLDS NO 1 01E+05
AVERAGE FLOW RATE 0 0376 M**3/SEC AVERAGE TEMPERATE 49 8 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	-	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.134	-0.049	0.132	0.072	-	0.320	0.360	0.378	0.353	0.219
-22.9	0.412	0.410	0.613	0.478	-	0.739	1.192	1.113	1.015	0.809
-14.4	5.350	5.791	5.981	5.707	-	6.410	6.160	6.060	6.210	5.953
-11.9	5.911	6.260	6.247	6.139	-	6.231	6.174	6.423	6.276	6.222
-9.3	6.348	6.447	6.435	6.410	-	6.640	6.454	6.514	6.536	6.558
-6.8	6.747	6.723	6.864	6.778	-	7.523	6.801	7.068	7.130	6.895
-4.3	7.006	7.042	7.110	7.053	-	7.252	7.212	7.224	7.229	7.098
-1.7	7.335	7.470	7.377	7.394	-	7.599	7.445	7.600	7.548	7.458
0.8	7.644	7.657	7.723	7.675	-	7.866	7.749	8.067	7.894	7.761
3.4	7.975	8.105	8.103	8.061	-	8.198	8.199	8.414	8.271	8.169
5.9	8.396	8.429	8.731	8.518	-	8.790	8.934	8.881	8.868	8.625
12.9	12.876	13.253	13.407	13.179	-	13.328	13.427	13.523	13.426	13.277
15.5	13.289	13.242	13.307	13.279	-	13.347	13.317	13.415	13.360	13.343
18.0	13.591	13.483	13.624	13.566	-	13.590	13.537	13.733	13.620	13.676
20.5	13.938	13.922	14.209	14.023	-	14.024	13.859	13.975	13.953	13.994
23.1	14.306	14.255	14.248	14.270	-	14.310	14.234	14.351	14.298	14.251
25.6	14.609	14.887	14.620	14.705	-	14.655	14.584	14.602	14.614	14.662
28.2	14.892	14.919	15.033	14.948	-	15.028	14.893	14.926	14.949	14.982
30.7	15.239	15.212	15.359	15.270	-	15.375	15.221	15.254	15.283	15.258
33.2	15.485	15.648	15.596	15.576	-	15.717	15.560	15.571	15.616	15.580
35.8	16.018	15.958	15.941	15.972	-	15.951	15.928	15.932	15.937	15.957
38.3	16.299	16.541	16.293	16.378	-	16.270	16.306	16.220	16.265	16.309
40.9	16.650	16.563	16.746	16.653	-	16.614	16.580	16.572	16.589	16.655
43.4	16.908	16.857	16.962	16.909	-	16.920	16.909	16.892	16.907	16.893
45.9	17.248	17.226	17.248	17.241	-	17.251	17.246	17.209	17.236	17.223
48.5	17.667	17.708	17.524	17.633	-	17.507	17.567	17.571	17.548	17.598
51.0	17.858	17.849	17.862	17.856	-	17.925	17.860	17.892	17.892	17.897
53.6	18.152	18.140	18.201	18.164	-	18.226	18.247	18.263	18.245	18.174
56.1	18.481	18.450	18.518	18.483	-	18.633	18.770	18.626	18.676	18.521
58.6	18.758	18.747	18.876	18.794	-	19.058	19.269	19.075	19.134	18.903
61.2	19.178	19.324	19.508	19.337	-	19.915	19.988	19.955	19.953	19.543
69.3	23.586	23.678	23.767	23.677	-	24.065	23.911	23.909	23.962	23.796
71.8	23.966	24.026	24.105	24.033	-	24.136	24.155	24.181	24.157	24.075
74.4	24.318	24.635	24.484	24.479	-	24.521	24.358	24.389	24.423	24.416
76.9	24.645	24.956	24.824	24.808	-	24.754	24.780	24.693	24.742	24.747
79.4	25.045	25.049	25.066	25.053	-	25.054	25.010	25.012	25.025	24.940
82.0	25.334	25.541	25.641	25.506	-	25.476	25.365	25.412	25.418	25.569
84.5	25.641	25.808	25.785	25.745	-	25.812	25.767	25.773	25.784	25.716
87.1	25.906	26.309	26.381	26.199	-	26.266	26.178	26.184	26.209	26.098
89.6	26.298	26.399	26.687	26.461	-	26.936	26.711	26.671	26.773	26.480

RUN NUMBER 14 BUNDLE B-5R REYNOLDS NO 1 01E+05
AVERAGE FLOW RATE 0 0376 M**3/SEC AVERAGE TEMPERATE 49 8 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (kPa)									
	TAP NUMBER			SOUTH SIDE AVERAGE	-	TAP NUMBER			WEST SIDE AVERAGE	BUNDLE AVERAGE
	7	8	9		-	10	11	12		
-25.4	0.355	0.287	0.268	0.303	-	0.296	0.139	0.007	0.147	0.219
-22.9	1.096	1.094	0.812	1.000	-	1.028	0.612	0.590	0.743	0.809
-14.4	6.052	6.182	5.978	6.071	-	5.845	6.027	5.606	5.826	5.953
-11.9	6.366	6.190	6.229	6.262	-	6.267	6.281	6.081	6.209	6.222
-9.3	6.552	6.578	6.499	6.543	-	7.177	6.474	6.575	6.742	6.558
-6.8	6.924	6.898	6.785	6.869	-	6.703	6.723	6.985	6.804	6.895
-4.3	7.059	7.095	7.078	7.078	-	6.997	7.003	7.093	7.031	7.098
-1.7	7.416	7.367	7.434	7.405	-	7.348	7.574	7.534	7.485	7.458
0.8	8.024	7.776	7.767	7.856	-	7.627	7.657	7.578	7.621	7.761
3.4	8.187	8.258	8.202	8.215	-	8.231	8.227	7.928	8.129	8.169
5.9	8.689	8.630	8.674	8.665	-	8.634	8.450	8.268	8.451	8.625
12.9	13.413	13.536	13.308	13.419	-	12.990	13.084	13.175	13.083	13.277
15.5	13.410	13.449	13.332	13.397	-	13.447	13.284	13.283	13.338	13.343
18.0	13.796	13.818	13.799	13.805	-	13.675	13.846	13.616	13.713	13.676
20.5	13.985	13.866	13.946	13.933	-	14.198	14.061	13.949	14.069	13.994
23.1	14.234	14.218	14.238	14.230	-	14.175	14.207	14.236	14.206	14.251
25.6	14.786	14.566	14.602	14.651	-	14.565	14.771	14.696	14.677	14.662
28.2	14.916	14.875	14.966	14.919	-	15.525	14.954	14.854	15.111	14.982
30.7	15.219	15.224	15.384	15.275	-	15.191	15.237	15.184	15.204	15.258
33.2	15.529	15.550	15.599	15.559	-	15.499	15.592	15.608	15.566	15.580
35.8	15.909	15.933	15.964	15.935	-	15.981	16.042	15.933	15.985	15.957
38.3	16.215	16.281	16.409	16.301	-	16.248	16.330	16.302	16.293	16.309
40.9	16.583	16.656	17.182	16.807	-	16.564	16.579	16.575	16.573	16.655
43.4	16.916	16.870	16.848	16.878	-	16.895	16.913	16.831	16.880	16.893
45.9	17.218	17.228	17.264	17.237	-	17.182	17.200	17.159	17.180	17.223
48.5	17.540	17.533	17.975	17.683	-	17.541	17.535	17.510	17.529	17.598
51.0	17.889	18.331	17.805	18.008	-	17.852	17.821	17.822	17.832	17.897
53.6	18.239	18.185	18.155	18.193	-	18.111	18.133	18.029	18.091	18.174
56.1	18.668	18.492	18.491	18.550	-	18.394	18.298	18.427	18.373	18.521
58.6	18.983	18.922	18.864	18.923	-	18.814	18.649	18.823	18.762	18.903
61.2	19.669	19.651	19.477	19.599	-	19.464	19.285	19.105	19.285	19.543
69.3	23.953	23.897	23.835	23.895	-	23.750	23.655	23.541	23.649	23.796
71.8	24.203	24.053	24.056	24.104	-	23.984	23.932	24.101	24.006	24.075
74.4	24.396	24.371	24.356	24.374	-	24.340	24.357	24.465	24.387	24.416
76.9	24.705	24.695	24.895	24.765	-	24.742	24.633	24.643	24.673	24.747
79.4	24.030	24.982	25.038	24.683	-	25.066	24.939	24.988	24.998	24.940
82.0	27.299	25.358	25.435	26.031	-	25.401	25.285	25.285	25.324	25.569
84.5	25.730	25.674	25.669	25.691	-	25.635	25.624	25.673	25.644	25.716
87.1	26.096	26.094	25.999	26.063	-	25.957	25.912	25.898	25.922	26.098
89.6	26.493	26.401	26.383	26.426	-	26.301	26.233	26.246	26.260	26.480

RUN NUMBER 15 BUNDLE B-5R REYNOLDS NO. 1.71E+05
AVERAGE FLOW RATE 0.0632 M**3/SEC AVERAGE TEMPERATE 49.8 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.197	-0.214	0.235	0.073	0.840	0.983	1.051	0.958	0.616
-22.9	1.050	1.044	1.428	1.174	1.886	3.130	3.085	2.701	2.233
-14.4	14.975	16.101	16.483	15.853	18.004	17.083	16.664	17.251	16.501
-11.9	16.151	17.327	17.094	16.857	17.135	16.985	17.700	17.273	17.138
-9.3	17.295	17.642	17.531	17.489	18.293	17.614	17.709	17.872	17.967
-6.8	18.350	18.257	18.698	18.435	20.923	18.514	19.404	19.614	18.838
-4.3	18.954	19.054	19.288	19.099	19.725	19.712	19.705	19.714	19.273
-1.7	19.850	20.247	19.929	20.008	20.692	20.078	20.723	20.498	20.213
0.8	20.631	20.671	20.899	20.734	21.334	21.028	22.024	21.462	21.038
3.4	21.464	21.890	21.874	21.743	22.191	22.180	22.868	22.413	22.100
5.9	22.564	22.661	23.658	22.961	23.888	24.273	23.995	24.052	23.298
12.9	34.666	35.947	36.371	35.661	35.990	36.270	36.569	36.277	35.921
15.5	35.777	35.570	35.791	35.713	35.865	35.807	36.144	35.939	35.935
18.0	36.601	36.242	36.684	36.509	36.563	36.313	37.001	36.626	36.856
20.5	37.477	37.409	38.294	37.727	37.748	37.277	37.544	37.522	37.643
23.1	38.449	38.203	38.196	38.283	38.402	38.139	38.412	38.318	38.218
25.6	39.139	40.110	39.112	39.454	39.310	39.067	39.130	39.169	39.335
28.2	39.852	39.943	40.424	40.073	40.291	39.910	39.969	40.056	40.150
30.7	40.710	40.671	41.156	40.845	41.205	40.725	40.779	40.903	40.801
33.2	41.182	41.841	41.685	41.569	42.107	41.600	41.596	41.768	41.616
35.8	42.677	42.591	42.428	42.565	42.516	42.389	42.462	42.456	42.528
38.3	43.361	44.225	43.474	43.687	43.332	43.412	43.210	43.318	43.477
40.9	44.316	44.090	44.647	44.351	44.211	44.065	44.119	44.131	44.346
43.4	44.915	44.882	44.968	44.922	44.979	44.951	44.895	44.942	44.889
45.9	45.759	45.721	45.801	45.760	45.747	45.785	45.658	45.730	45.716
48.5	46.986	47.054	46.491	46.844	46.350	46.556	46.500	46.469	46.703
51.0	47.318	47.332	47.282	47.311	47.461	47.310	47.410	47.394	47.431
53.6	48.098	48.010	48.174	48.094	48.264	48.346	48.350	48.320	48.117
56.1	48.933	48.806	49.033	48.924	49.399	49.774	49.314	49.495	49.015
58.6	49.653	49.539	49.905	49.699	50.403	51.122	50.473	50.666	50.021
61.2	50.649	51.006	51.662	51.106	52.580	52.776	52.772	52.709	51.682
69.3	62.528	62.944	63.144	62.872	64.147	63.630	63.659	63.812	63.262
71.8	63.548	63.834	64.042	63.808	64.162	64.187	64.151	64.167	63.924
74.4	64.509	65.587	65.085	65.060	65.099	64.675	64.691	64.822	64.816
76.9	65.376	66.358	65.979	65.904	65.663	65.947	65.479	65.696	65.674
79.4	66.392	66.359	66.420	66.391	66.376	66.271	66.281	66.309	66.001
82.0	67.073	67.781	68.129	67.661	67.453	67.186	67.207	67.282	67.727
84.5	67.788	68.407	68.269	68.155	68.431	68.192	68.252	68.292	68.061
87.1	68.518	69.809	70.022	69.450	69.588	69.367	69.313	69.423	69.085
89.6	69.524	69.768	70.645	69.979	71.457	70.686	70.629	70.924	70.039

RUN NUMBER 15 BUNDLE B-5R REYNOLDS NO 1.71E+05
AVERAGE FLOW RATE: 0.0632 M**3/SEC. AVERAGE TEMPERATE 49.8 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE		TAP NUMBER 10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	1.066	0.889	0.794	0.916	-	0.997	0.503	0.051	0.517	0.616
-22.9	3.179	3.223	2.278	2.893	-	3.099	1.743	1.646	2.163	2.233
-14.4	16.645	17.165	16.539	16.783	-	16.250	16.746	15.355	16.117	16.501
-11.9	17.657	17.032	17.133	17.274	-	17.400	17.312	16.737	17.150	17.138
-9.3	17.973	17.964	17.835	17.924	-	19.869	17.819	18.064	18.584	17.967
-6.8	19.021	18.866	18.441	18.776	-	18.213	18.285	19.088	18.529	18.838
-4.3	19.212	19.143	19.189	19.181	-	19.014	19.014	19.267	19.098	19.273
-1.7	20.090	19.935	20.046	20.024	-	19.864	20.595	20.509	20.323	20.213
0.8	21.884	21.211	21.000	21.365	-	20.630	20.720	20.427	20.592	21.038
3.4	22.129	22.390	22.161	22.227	-	22.369	22.326	21.357	22.017	22.100
5.9	23.456	23.249	23.389	23.365	-	23.404	22.825	22.210	22.813	23.298
12.9	36.370	36.524	36.043	36.312	-	35.184	35.334	35.785	35.434	35.921
15.5	36.152	36.168	35.970	36.097	-	36.389	35.808	35.784	35.994	35.935
18.0	37.217	37.274	37.236	37.243	-	36.940	37.465	36.735	37.047	36.856
20.5	37.560	37.213	37.477	37.417	-	38.320	37.924	37.479	37.908	37.643
23.1	38.206	38.155	38.145	38.169	-	37.980	38.165	38.169	38.105	38.218
25.6	39.835	39.032	39.115	39.328	-	38.997	39.764	39.411	39.391	39.335
28.2	39.862	39.770	40.091	39.907	-	41.883	40.053	39.758	40.565	40.150
30.7	40.750	40.688	41.289	40.909	-	40.505	40.694	40.440	40.546	40.801
33.2	41.470	41.492	41.685	41.549	-	41.370	41.691	41.668	41.577	41.616
35.8	42.367	42.443	42.475	42.428	-	42.628	42.878	42.481	42.663	42.528
38.3	43.158	43.435	43.856	43.483	-	43.290	43.568	43.399	43.419	43.477
40.9	44.086	44.299	46.175	44.853	-	43.923	44.098	44.125	44.049	44.346
43.4	44.947	44.886	44.751	44.861	-	44.884	44.892	44.721	44.832	44.889
45.9	45.727	45.767	45.857	45.784	-	45.572	45.682	45.519	45.591	45.716
48.5	46.491	46.460	47.944	46.965	-	46.623	46.489	46.487	46.533	46.703
51.0	47.379	48.730	47.199	47.769	-	47.328	47.206	47.219	47.251	47.431
53.6	48.247	48.145	48.073	48.155	-	47.951	48.064	47.677	47.897	48.117
56.1	49.383	48.899	48.934	49.072	-	48.611	48.354	48.736	48.567	49.015
58.6	50.250	50.061	49.907	50.073	-	49.765	49.298	49.876	49.647	50.021
61.2	52.072	52.016	51.596	51.895	-	51.640	50.974	50.444	51.019	51.682
69.3	63.704	63.596	63.341	63.547	-	63.175	62.852	62.418	62.815	63.262
71.8	64.288	63.864	63.843	63.998	-	63.639	63.495	64.036	63.723	63.924
74.4	64.709	64.647	64.633	64.663	-	64.595	64.633	64.924	64.717	64.816
76.9	65.548	65.477	66.093	65.706	-	65.594	65.226	65.354	65.391	65.674
79.4	62.958	66.154	66.306	65.140	-	66.298	66.060	66.129	66.162	66.001
82.0	72.407	67.020	67.380	68.936	-	67.252	66.929	66.906	67.029	67.727
84.5	68.118	67.896	67.893	67.969	-	67.817	67.769	67.897	67.828	68.061
87.1	69.032	69.093	68.781	68.968	-	68.638	68.441	68.423	68.501	69.085
89.6	70.079	69.762	69.717	69.853	-	69.515	69.287	69.396	69.399	70.039

RUN NUMBER: 16 BUNDLE: B-5R REYNOLDS NO. 1.71E+05
AVERAGE FLOW RATE: 0.0632 M**3/SEC AVERAGE TEMPERATE: 49.9 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE	TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.424	-0.259	0.144	0.103	0.613	0.781	0.983	0.792	0.593
-22.9	1.089	1.046	1.390	1.175	1.479	2.758	3.050	2.429	2.189
-14.4	15.351	16.385	16.808	16.181	18.432	17.582	17.020	17.678	16.838
-11.9	16.449	17.667	17.419	17.178	17.503	17.354	17.997	17.618	17.466
-9.3	17.579	17.955	17.864	17.799	18.609	17.979	18.056	18.215	18.294
-6.8	18.680	18.590	19.035	18.768	21.211	18.875	19.746	19.944	19.172
-4.3	19.278	19.371	19.618	19.422	20.042	20.046	20.034	20.041	19.597
-1.7	20.161	20.570	20.240	20.324	21.031	20.406	21.052	20.830	20.536
0.8	20.937	21.001	21.241	21.059	21.665	21.368	22.353	21.795	21.360
3.4	21.789	22.212	22.190	22.064	22.513	22.508	23.197	22.739	22.425
5.9	22.884	22.994	23.986	23.288	24.256	24.637	24.328	24.407	23.635
12.9	35.115	36.401	36.849	36.122	36.611	36.865	37.095	36.857	36.443
15.5	36.211	36.032	36.253	36.165	36.338	36.294	36.618	36.417	36.391
18.0	37.053	36.695	37.141	36.963	37.008	36.772	37.461	37.080	37.313
20.5	37.920	37.850	38.758	38.176	38.219	37.733	38.005	37.986	38.090
23.1	38.861	38.639	38.625	38.708	38.848	38.580	38.854	38.761	38.651
25.6	39.538	40.508	39.528	39.858	39.726	39.458	39.540	39.575	39.743
28.2	40.261	40.335	40.817	40.471	40.686	40.306	40.380	40.457	40.549
30.7	41.090	41.079	41.533	41.234	41.590	41.116	41.174	41.293	41.190
33.2	41.576	42.238	42.088	41.967	42.501	41.994	41.992	42.163	42.011
35.8	43.041	42.978	42.827	42.949	42.900	42.784	42.839	42.841	42.908
38.3	43.742	44.577	43.857	44.059	43.690	43.786	43.609	43.695	43.855
40.9	44.692	44.454	45.004	44.717	44.566	44.434	44.499	44.499	44.717
43.4	45.287	45.254	45.325	45.289	45.345	45.316	45.249	45.304	45.256
45.9	46.125	46.080	46.163	46.123	46.104	46.149	46.027	46.093	46.082
48.5	47.342	47.409	46.843	47.198	46.699	46.918	46.866	46.828	47.058
51.0	47.677	47.684	47.638	47.666	47.798	47.658	47.771	47.742	47.786
53.6	48.453	48.370	48.531	48.451	48.586	48.691	48.714	48.664	48.469
56.1	49.286	49.150	49.379	49.271	49.748	50.096	49.654	49.833	49.361
58.6	49.997	49.889	50.253	50.046	50.740	51.449	50.811	51.000	50.363
61.2	51.042	51.367	52.019	51.476	52.914	53.117	53.121	53.050	52.031
69.3	62.930	63.339	63.524	63.264	64.540	63.993	64.025	64.186	63.656
71.8	63.937	64.241	64.449	64.209	64.566	64.587	64.564	64.573	64.323
74.4	64.910	65.997	65.477	65.461	65.490	65.090	65.098	65.226	65.215
76.9	65.782	66.771	66.384	66.312	66.071	66.114	65.879	66.021	66.056
79.4	66.781	66.748	66.820	66.783	66.782	66.670	66.675	66.709	66.393
82.0	67.454	68.186	68.530	68.057	67.840	67.583	67.612	67.678	68.129
84.5	68.163	68.797	68.654	68.538	68.826	68.580	68.661	68.689	68.452
87.1	68.896	70.208	70.410	69.838	69.966	69.761	69.700	69.809	69.479
89.6	69.898	70.151	71.053	70.367	71.843	71.072	71.021	71.312	70.430

RUN NUMBER 16 BUNDLE B-5R REYNOLDS NO. 1.71E+05
AVERAGE FLOW RATE: 0.0632 M**3/SEC. AVERAGE TEMPERATE: 49.9 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER			SOUTH SIDE AVERAGE	-	TAP NUMBER			WEST SIDE AVERAGE	BUNDLE AVERAGE
	7	8	9		-	10	11	12		
-25.4	1.065	0.908	0.835	0.936	-	1.048	0.520	0.060	0.543	0.593
-22.9	3.208	3.257	2.333	2.933	-	3.146	1.798	1.710	2.218	2.189
-14.4	16.969	17.459	16.863	17.097	-	16.540	17.038	15.606	16.395	16.838
-11.9	17.923	17.338	17.488	17.583	-	17.765	17.624	17.065	17.484	17.466
-9.3	18.282	18.324	18.188	18.265	-	20.166	18.124	18.398	18.896	18.294
-6.8	19.369	19.206	18.804	19.126	-	18.531	18.594	19.420	18.848	19.172
-4.3	19.538	19.478	19.517	19.511	-	19.334	19.332	19.576	19.414	19.597
-1.7	20.401	20.260	20.336	20.332	-	20.191	20.925	20.859	20.659	20.536
0.8	22.188	21.520	21.307	21.672	-	20.952	21.037	20.750	20.913	21.360
3.4	22.437	22.713	22.478	22.543	-	22.696	22.670	21.693	22.353	22.425
5.9	23.764	23.561	23.721	23.682	-	23.757	23.172	22.560	23.163	23.635
12.9	36.917	37.070	36.542	36.843	-	35.698	35.860	36.297	35.951	36.443
15.5	36.610	36.606	36.431	36.549	-	36.827	36.239	36.232	36.433	36.391
18.0	37.676	37.743	37.714	37.711	-	37.394	37.914	37.182	37.496	37.313
20.5	38.019	37.660	37.910	37.863	-	38.756	38.347	37.909	38.337	38.090
23.1	38.637	38.584	38.581	38.601	-	38.398	38.590	38.610	38.533	38.651
25.6	40.229	39.447	39.534	39.737	-	39.415	40.169	39.822	39.802	39.743
28.2	40.286	40.173	40.482	40.313	-	42.261	40.451	40.148	40.954	40.549
30.7	41.154	41.063	41.679	41.299	-	40.893	41.082	40.834	40.936	41.190
33.2	41.863	41.892	42.064	41.939	-	41.776	42.086	42.063	41.975	42.011
35.8	42.755	42.816	42.845	42.805	-	43.005	43.249	42.862	43.039	42.908
38.3	43.547	43.814	44.252	43.871	-	43.683	43.934	43.768	43.795	43.855
40.9	44.451	44.670	46.551	45.224	-	44.306	44.490	44.486	44.427	44.717
43.4	45.338	45.225	45.131	45.231	-	45.271	45.254	45.076	45.200	45.256
45.9	46.089	46.143	46.218	46.150	-	45.941	46.058	45.893	45.964	46.082
48.5	46.852	46.818	48.269	47.313	-	46.977	46.857	46.848	46.894	47.058
51.0	47.734	49.092	47.554	48.127	-	47.683	47.551	47.600	47.611	47.786
53.6	48.608	48.480	48.433	48.507	-	48.303	48.413	48.049	48.255	48.469
56.1	49.733	49.241	49.280	49.418	-	48.970	48.701	49.094	48.922	49.361
58.6	50.595	50.388	50.247	50.410	-	50.119	49.646	50.222	49.996	50.363
61.2	52.423	52.365	51.921	52.236	-	51.959	51.329	50.792	51.360	52.031
69.3	64.074	63.990	63.775	63.946	-	63.596	63.265	62.826	63.229	63.656
71.8	64.692	64.250	64.253	64.398	-	64.020	63.893	64.420	64.111	64.323
74.4	65.114	65.052	65.031	65.065	-	64.992	65.013	65.321	65.109	65.215
76.9	65.940	65.870	66.491	66.100	-	66.005	65.608	65.755	65.789	66.056
79.4	63.340	66.552	66.710	65.534	-	66.676	66.452	66.510	66.546	66.393
82.0	72.876	67.428	67.778	69.360	-	67.641	67.323	67.298	67.421	68.129
84.5	68.505	68.299	68.280	68.361	-	68.203	68.178	68.283	68.221	68.452
87.1	69.428	69.503	69.177	69.369	-	69.035	68.836	68.826	68.899	69.479
89.6	70.477	70.162	70.130	70.256	-	69.917	69.654	69.780	69.784	70.430

RUN NUMBER: 17 BUNDLE: B-5R REYNOLDS NO. 1.01E+05
AVERAGE FLOW RATE: 0.0375 M**3/SEC. AVERAGE TEMPERATE: 49.9 DEG. C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	TAP NUMBER 2	TAP NUMBER 3	NORTH SIDE AVERAGE		TAP NUMBER 4	TAP NUMBER 5	TAP NUMBER 6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.018	-0.075	0.080	0.007	-	0.241	0.300	0.378	0.306	0.212
-22.9	0.424	0.409	0.550	0.461	-	0.603	1.000	1.121	0.908	0.807
-14.4	5.697	6.067	6.205	5.990	-	6.739	6.450	6.271	6.487	6.198
-11.9	6.127	6.498	6.426	6.350	-	6.475	6.430	6.612	6.505	6.438
-9.3	6.545	6.661	6.650	6.619	-	6.871	6.680	6.699	6.750	6.771
-6.8	6.931	6.931	7.060	6.974	-	7.708	7.017	7.280	7.335	7.099
-4.3	7.203	7.235	7.309	7.249	-	7.450	7.426	7.441	7.439	7.306
-1.7	7.551	7.675	7.588	7.605	-	7.801	7.644	7.806	7.750	7.664
0.8	7.863	7.890	7.959	7.904	-	8.093	8.002	8.295	8.130	7.992
3.4	8.183	8.316	8.327	8.275	-	8.443	8.447	8.639	8.509	8.391
5.9	8.600	8.652	8.950	8.734	-	9.080	9.196	9.103	9.126	8.853
12.9	13.189	13.582	13.694	13.488	-	13.656	13.747	13.842	13.749	13.597
15.5	13.568	13.545	13.599	13.571	-	13.642	13.618	13.734	13.665	13.644
18.0	13.884	13.789	13.918	13.863	-	13.926	13.831	14.035	13.931	13.989
20.5	14.236	14.209	14.483	14.309	-	14.334	14.168	14.278	14.260	14.291
23.1	14.593	14.538	14.518	14.550	-	14.591	14.494	14.609	14.565	14.536
25.6	14.880	15.168	14.896	14.981	-	14.932	14.848	14.887	14.889	14.939
28.2	15.176	15.198	15.335	15.236	-	15.302	15.184	15.210	15.232	15.264
30.7	15.507	15.490	15.631	15.542	-	15.655	15.498	15.525	15.559	15.530
33.2	15.722	15.937	15.882	15.847	-	15.989	15.846	15.847	15.894	15.853
35.8	16.244	16.210	16.174	16.210	-	16.195	16.139	16.164	16.166	16.194
38.3	16.526	16.778	16.553	16.619	-	16.504	16.529	16.494	16.509	16.552
40.9	16.887	16.814	16.965	16.889	-	16.840	16.807	16.817	16.821	16.885
43.4	17.140	17.134	17.128	17.134	-	17.152	17.140	17.128	17.140	17.122
45.9	17.456	17.451	17.466	17.458	-	17.461	17.469	17.432	17.454	17.448
48.5	17.883	17.927	17.745	17.852	-	17.724	17.782	17.767	17.758	17.814
51.0	18.082	18.083	18.066	18.077	-	18.121	18.085	18.123	18.109	18.116
53.6	18.386	18.342	18.442	18.390	-	18.434	18.458	18.480	18.457	18.393
56.1	18.712	18.688	18.761	18.720	-	18.854	18.981	18.862	18.899	18.747
58.6	18.996	18.985	19.102	19.028	-	19.270	19.477	19.293	19.347	19.128
61.2	19.450	19.560	19.770	19.594	-	20.080	20.164	20.164	20.136	19.773
69.3	23.898	24.004	24.093	23.999	-	24.387	24.247	24.226	24.287	24.112
71.8	24.279	24.363	24.423	24.355	-	24.489	24.470	24.482	24.480	24.398
74.4	24.642	24.962	24.809	24.804	-	24.835	24.697	24.710	24.747	24.736
76.9	24.988	25.265	25.153	25.135	-	25.080	25.098	25.010	25.063	25.066
79.4	25.348	25.350	25.367	25.355	-	25.357	25.327	25.331	25.338	25.242
82.0	25.629	25.835	25.954	25.806	-	25.758	25.674	25.689	25.707	25.874
84.5	25.916	26.106	26.079	26.034	-	26.131	26.056	26.085	26.091	26.014
87.1	26.202	26.597	26.675	26.492	-	26.583	26.498	26.494	26.525	26.403
89.6	26.584	26.691	26.966	26.747	-	27.222	26.988	26.990	27.067	26.771

RUN NUMBER: 17 BUNDLE: B-5R REYNOLDS NO. 1.01E+05
AVERAGE FLOW RATE: 0.0375 M**3/SEC. AVERAGE TEMPERATE: 49.9 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE	-	10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.394	0.333	0.308	0.345	-	0.349	0.176	0.045	0.190	0.212
-22.9	1.145	1.150	0.868	1.054	-	1.092	0.669	0.656	0.805	0.807
-14.4	6.240	6.385	6.214	6.280	-	6.080	6.246	5.786	6.037	6.198
-11.9	6.565	6.403	6.437	6.468	-	6.492	6.481	6.307	6.427	6.438
-9.3	6.759	6.775	6.726	6.754	-	7.425	6.684	6.782	6.964	6.771
-6.8	7.140	7.103	7.000	7.081	-	6.910	6.924	7.179	7.004	7.099
-4.3	7.284	7.268	7.296	7.282	-	7.220	7.238	7.300	7.253	7.306
-1.7	7.631	7.589	7.619	7.613	-	7.555	7.767	7.738	7.687	7.664
0.8	8.252	8.035	7.970	8.086	-	7.865	7.883	7.793	7.847	7.992
3.4	8.406	8.477	8.422	8.435	-	8.446	8.433	8.152	8.344	8.391
5.9	8.910	8.839	8.879	8.876	-	8.855	8.679	8.494	8.676	8.853
12.9	13.757	13.808	13.644	13.736	-	13.334	13.395	13.519	13.416	13.597
15.5	13.733	13.717	13.656	13.702	-	13.741	13.592	13.579	13.637	13.644
18.0	14.096	14.134	14.111	14.114	-	14.005	14.177	13.959	14.047	13.989
20.5	14.279	14.163	14.247	14.229	-	14.502	14.357	14.238	14.366	14.291
23.1	14.536	14.528	14.524	14.529	-	14.462	14.512	14.523	14.499	14.536
25.6	15.076	14.845	14.883	14.935	-	14.842	15.047	14.968	14.952	14.939
28.2	15.193	15.140	15.247	15.193	-	15.806	15.229	15.146	15.394	15.264
30.7	15.508	15.495	15.670	15.558	-	15.449	15.509	15.422	15.460	15.530
33.2	15.802	15.810	15.874	15.828	-	15.776	15.891	15.866	15.844	15.853
35.8	16.149	16.152	16.186	16.162	-	16.223	16.300	16.192	16.238	16.194
38.3	16.456	16.542	16.645	16.548	-	16.503	16.574	16.520	16.532	16.552
40.9	16.816	16.872	17.406	17.031	-	16.769	16.814	16.814	16.799	16.885
43.4	17.142	17.099	17.088	17.110	-	17.125	17.115	17.074	17.105	17.122
45.9	17.444	17.463	17.486	17.465	-	17.417	17.449	17.383	17.416	17.448
48.5	17.762	17.746	18.175	17.894	-	17.780	17.738	17.744	17.754	17.814
51.0	18.100	18.559	18.027	18.229	-	18.070	18.043	18.033	19.049	18.116
53.6	18.426	18.394	18.377	18.399	-	18.352	18.365	18.258	18.325	18.393
56.1	18.875	18.710	18.721	18.769	-	18.612	18.538	18.650	18.600	18.747
58.6	19.205	19.142	19.095	19.147	-	19.035	18.878	19.058	18.990	19.128
61.2	19.917	19.890	19.729	19.845	-	19.699	19.522	19.328	19.516	19.773
69.3	24.257	24.222	24.121	24.200	-	24.061	23.980	23.851	23.964	24.112
71.8	24.538	24.388	24.373	24.433	-	24.311	24.254	24.407	24.324	24.398
74.4	24.705	24.684	24.682	24.690	-	24.665	24.662	24.775	24.701	24.736
76.9	25.031	25.017	25.208	25.085	-	25.038	24.924	24.978	24.980	25.066
79.4	24.273	25.289	25.358	24.973	-	25.357	25.266	25.278	25.300	25.242
82.0	27.656	25.663	25.733	26.351	-	25.700	25.605	25.587	25.631	25.874
84.5	26.046	25.974	25.960	25.993	-	25.937	25.927	25.950	25.938	26.014
87.1	26.401	26.416	26.309	26.375	-	26.255	26.210	26.198	26.221	26.403
89.6	26.809	26.691	26.685	26.728	-	26.606	26.504	26.521	26.544	26.771

RUN NUMBER 18 BUNDLE B-5R REYNOLDS NO 5 69E+04
AVERAGE FLOW RATE: 0 0207 M**3/SEC AVERAGE TEMPERATE 51 1 DEG C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	2	3	NORTH SIDE AVERAGE	-	4	5	6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.007	0.038	0.043	0.029	-	0.133	0.147	0.154	0.145	0.080
-22.9	0.218	0.179	0.173	0.190	-	0.259	0.344	0.356	0.320	0.279
-14.4	1.805	1.897	1.962	1.888	-	2.036	2.000	1.965	2.000	1.940
-11.9	1.932	2.041	2.055	2.009	-	2.060	2.009	2.093	2.054	2.031
-9.3	2.130	2.086	2.090	2.102	-	2.209	2.110	2.142	2.154	2.145
-6.8	2.165	2.103	2.205	2.158	-	2.352	2.236	2.321	2.303	2.231
-4.3	2.284	2.296	2.345	2.309	-	2.299	2.310	2.378	2.329	2.318
-1.7	2.439	2.451	2.375	2.421	-	2.511	2.428	2.529	2.489	2.451
0.8	2.610	2.550	2.560	2.573	-	2.621	2.562	2.645	2.609	2.585
3.4	2.665	2.705	2.656	2.676	-	2.730	2.723	2.808	2.754	2.712
5.9	2.832	2.819	2.871	2.840	-	2.882	2.885	2.946	2.904	2.870
12.9	4.286	4.433	4.487	4.402	-	4.515	4.518	4.514	4.516	4.453
15.5	4.425	4.458	4.405	4.429	-	4.404	4.409	4.440	4.418	4.431
18.0	4.551	4.515	4.538	4.535	-	4.468	4.572	4.532	4.524	4.560
20.5	4.620	4.663	4.682	4.655	-	4.738	4.687	4.663	4.696	4.667
23.1	4.767	4.764	4.744	4.758	-	4.773	4.807	4.743	4.774	4.757
25.6	4.893	4.970	4.890	4.918	-	4.909	4.899	4.902	4.903	4.901
28.2	4.996	4.999	5.009	5.002	-	5.011	5.003	4.986	5.000	5.006
30.7	5.062	5.092	5.122	5.092	-	5.152	5.078	5.122	5.117	5.100
33.2	5.178	5.237	5.254	5.223	-	5.258	5.202	5.191	5.217	5.228
35.8	5.328	5.308	5.238	5.291	-	5.290	5.274	5.299	5.288	5.298
38.3	5.480	5.474	5.442	5.465	-	5.445	5.382	5.370	5.399	5.437
40.9	5.544	5.553	5.562	5.553	-	5.551	5.541	5.542	5.544	5.559
43.4	5.634	5.637	5.636	5.636	-	5.714	5.621	5.633	5.656	5.637
45.9	5.780	5.738	5.731	5.749	-	5.775	5.751	5.740	5.755	5.746
48.5	5.881	5.890	5.915	5.895	-	5.851	5.860	5.884	5.865	5.878
51.0	6.005	5.959	5.994	5.986	-	5.977	5.992	5.984	5.984	5.980
53.6	6.053	6.049	6.084	6.062	-	6.053	6.082	6.094	6.076	6.062
56.1	6.209	6.176	6.219	6.201	-	6.250	6.262	6.248	6.253	6.198
58.6	6.280	6.258	6.255	6.264	-	6.356	6.402	6.336	6.365	6.305
61.2	6.417	6.478	6.500	6.465	-	6.646	6.672	6.696	6.671	6.541
69.3	7.879	7.923	7.963	7.922	-	8.010	7.952	8.002	7.988	7.943
71.8	7.962	8.067	8.059	8.029	-	8.040	8.094	8.052	8.062	8.047
74.4	8.145	8.267	8.165	8.192	-	8.203	8.194	8.120	8.172	8.162
76.9	8.266	8.318	8.255	8.280	-	8.261	8.290	8.257	8.269	8.266
79.4	8.374	8.372	8.362	8.369	-	8.408	8.402	8.374	8.395	8.355
82.0	8.496	8.522	8.516	8.511	-	8.535	8.463	8.519	8.506	8.535
84.5	8.613	8.587	8.631	8.610	-	8.667	8.583	8.633	8.628	8.613
87.1	8.697	8.817	8.844	8.786	-	8.793	8.781	8.767	8.780	8.746
89.6	8.787	8.812	8.948	8.849	-	8.991	8.929	8.944	8.955	8.870

RUN NUMBER 18 BUNDLE: B-5R REYNOLDS NO. 5.69E+04
AVERAGE FLOW RATE: 0.0207 M**3/SEC AVERAGE TEMPERATE: 51.1 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER			SOUTH SIDE AVERAGE	-	TAP NUMBER			WEST SIDE AVERAGE	BUNDLE AVERAGE
	7	8	9		-	10	11	12		
-25.4	0.122	0.090	0.076	0.096	-	0.120	0.052	-0.027	0.048	0.080
-22.9	0.360	0.357	0.316	0.345	-	0.375	0.198	0.214	0.262	0.279
-14.4	1.981	1.985	1.949	1.972	-	1.882	1.962	1.858	1.901	1.940
-11.9	2.050	1.997	2.019	2.022	-	2.052	2.065	2.001	2.039	2.031
-9.3	2.118	2.140	2.148	2.135	-	2.313	2.108	2.143	2.188	2.145
-6.8	2.264	2.308	2.214	2.262	-	2.152	2.207	2.247	2.202	2.231
-4.3	2.351	2.347	2.275	2.324	-	2.264	2.311	2.352	2.309	2.318
-1.7	2.432	2.462	2.443	2.446	-	2.385	2.500	2.463	2.449	2.451
0.8	2.607	2.589	2.600	2.599	-	2.580	2.566	2.529	2.558	2.585
3.4	2.727	2.739	2.729	2.732	-	2.735	2.691	2.632	2.686	2.712
5.9	2.913	2.897	2.895	2.902	-	2.908	2.818	2.778	2.835	2.870
12.9	4.490	4.527	4.440	4.486	-	4.402	4.389	4.441	4.411	4.453
15.5	4.479	4.474	4.406	4.453	-	4.445	4.427	4.400	4.424	4.431
18.0	4.581	4.648	4.620	4.616	-	4.559	4.612	4.528	4.566	4.560
20.5	4.659	4.654	4.663	4.659	-	4.662	4.663	4.649	4.658	4.667
23.1	4.759	4.765	4.754	4.759	-	4.720	4.723	4.772	4.738	4.757
25.6	4.956	4.858	4.866	4.893	-	4.851	4.921	4.900	4.891	4.901
28.2	5.008	4.982	4.912	4.967	-	5.198	5.004	4.965	5.056	5.006
30.7	5.095	5.081	5.156	5.111	-	5.080	5.076	5.082	5.079	5.100
33.2	5.194	5.217	5.305	5.239	-	5.196	5.267	5.233	5.232	5.228
35.8	5.235	5.353	5.312	5.300	-	5.309	5.312	5.313	5.311	5.298
38.3	5.427	5.442	5.478	5.449	-	5.377	5.473	5.450	5.433	5.437
40.9	5.537	5.566	5.674	5.592	-	5.617	5.530	5.495	5.547	5.559
43.4	5.635	5.616	5.595	5.615	-	5.642	5.620	5.657	5.640	5.637
45.9	5.778	5.755	5.713	5.749	-	5.726	5.746	5.719	5.730	5.746
48.5	5.852	5.853	5.923	5.876	-	5.867	5.855	5.909	5.877	5.878
51.0	5.966	6.095	5.921	5.994	-	5.956	5.936	5.975	5.956	5.980
53.6	6.029	6.029	6.116	6.058	-	6.039	6.086	6.028	6.051	6.062
56.1	6.179	6.168	6.228	6.192	-	6.147	6.127	6.166	6.146	6.198
58.6	6.376	6.302	6.309	6.329	-	6.282	6.227	6.276	6.262	6.305
61.2	6.604	6.567	6.529	6.567	-	6.513	6.463	6.411	6.462	6.541
69.3	7.947	8.021	7.943	7.971	-	7.891	7.903	7.885	7.893	7.943
71.8	8.114	8.065	8.039	8.073	-	8.042	8.012	8.020	8.025	8.047
74.4	8.152	8.127	8.186	8.155	-	8.117	8.127	8.139	8.127	8.162
76.9	8.246	8.238	8.291	8.259	-	8.258	8.283	8.230	8.257	8.266
79.4	8.125	8.371	8.373	8.290	-	8.394	8.358	8.346	8.366	8.355
82.0	8.965	8.465	8.509	8.646	-	8.481	8.484	8.467	8.477	8.535
84.5	8.640	8.580	8.612	8.611	-	8.582	8.647	8.579	8.603	8.613
87.1	8.732	8.723	8.727	8.727	-	8.694	8.689	8.687	8.690	8.746
89.6	8.886	8.886	8.866	8.880	-	8.859	8.812	8.813	8.828	8.878

RUN NUMBER 19 BUNDLE: B-5R REYNOLDS NO. 1.77E+04
AVERAGE FLOW RATE: 0.0065 M**3/SEC. AVERAGE TEMPERATE 50.4 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	2	3	NORTH SIDE AVERAGE	-	4	TAP NUMBER 5	6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.028	0.001	0.017	0.015	-	0.022	0.016	0.025	0.021	0.016
-22.9	0.027	0.044	0.019	0.030	-	0.020	0.028	0.041	0.030	0.030
-14.4	0.202	0.206	0.213	0.207	-	0.212	0.213	0.222	0.215	0.213
-11.9	0.220	0.226	0.215	0.220	-	0.221	0.220	0.228	0.223	0.221
-9.3	0.243	0.236	0.251	0.243	-	0.247	0.250	0.255	0.251	0.243
-6.8	0.278	0.246	0.245	0.256	-	0.260	0.260	0.267	0.262	0.258
-4.3	0.281	0.277	0.278	0.279	-	0.271	0.280	0.258	0.270	0.274
-1.7	0.274	0.269	0.261	0.268	-	0.280	0.279	0.292	0.284	0.286
0.8	0.302	0.290	0.285	0.292	-	0.292	0.274	0.305	0.290	0.293
3.4	0.308	0.316	0.306	0.310	-	0.325	0.315	0.315	0.318	0.312
5.9	0.329	0.322	0.322	0.324	-	0.329	0.322	0.333	0.328	0.329
12.9	0.514	0.518	0.514	0.515	-	0.514	0.516	0.524	0.518	0.513
15.5	0.512	0.544	0.529	0.528	-	0.530	0.526	0.539	0.532	0.535
18.0	0.568	0.544	0.552	0.555	-	0.555	0.556	0.560	0.557	0.554
20.5	0.562	0.590	0.583	0.579	-	0.567	0.559	0.553	0.560	0.566
23.1	0.595	0.574	0.586	0.585	-	0.579	0.573	0.605	0.586	0.581
25.6	0.613	0.613	0.612	0.612	-	0.621	0.620	0.607	0.616	0.617
28.2	0.627	0.632	0.626	0.628	-	0.638	0.632	0.627	0.632	0.627
30.7	0.655	0.638	0.648	0.647	-	0.623	0.630	0.643	0.632	0.642
33.2	0.667	0.647	0.662	0.659	-	0.663	0.653	0.655	0.657	0.657
35.8	0.679	0.688	0.677	0.682	-	0.677	0.673	0.715	0.688	0.686
38.3	0.704	0.711	0.712	0.709	-	0.693	0.703	0.696	0.697	0.707
40.9	0.719	0.706	0.721	0.715	-	0.690	0.730	0.718	0.713	0.716
43.4	0.736	0.717	0.716	0.723	-	0.738	0.716	0.718	0.724	0.725
45.9	0.748	0.748	0.763	0.753	-	0.772	0.767	0.756	0.765	0.758
48.5	0.771	0.762	0.761	0.765	-	0.769	0.775	0.776	0.773	0.770
51.0	0.779	0.766	0.778	0.774	-	0.786	0.784	0.786	0.785	0.782
53.6	0.795	0.807	0.806	0.803	-	0.792	0.806	0.787	0.795	0.797
56.1	0.818	0.830	0.815	0.821	-	0.824	0.820	0.825	0.823	0.818
58.6	0.825	0.826	0.826	0.826	-	0.842	0.837	0.839	0.840	0.832
61.2	0.855	0.841	0.870	0.855	-	0.870	0.881	0.875	0.876	0.862
69.3	1.021	1.018	1.031	1.023	-	1.039	1.041	1.035	1.038	1.028
71.8	1.041	1.041	1.051	1.044	-	1.046	1.048	1.036	1.043	1.039
74.4	1.043	1.066	1.066	1.058	-	1.070	1.061	1.052	1.061	1.056
76.9	1.063	1.084	1.063	1.070	-	1.075	1.079	1.065	1.073	1.070
79.4	1.076	1.086	1.092	1.085	-	1.078	1.084	1.068	1.077	1.082
82.0	1.100	1.086	1.121	1.102	-	1.117	1.124	1.101	1.114	1.105
84.5	1.121	1.120	1.111	1.117	-	1.107	1.102	1.106	1.105	1.112
87.1	1.110	1.139	1.146	1.132	-	1.132	1.124	1.121	1.126	1.127
89.6	1.137	1.140	1.158	1.145	-	1.142	1.159	1.155	1.152	1.145

RUN NUMBER: 19 BUNDLE: B-5R REYNOLDS NO. 1.77E+04
AVERAGE FLOW RATE: 0.0065 M**3/SEC. AVERAGE TEMPERATE: 50.4 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE	-	10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.007	0.017	0.016	0.014	-	0.011	0.024	0.014	0.016	0.016
-22.9	0.028	0.038	0.041	0.036	-	0.027	0.029	0.013	0.023	0.030
-14.4	0.214	0.223	0.211	0.216	-	0.212	0.209	0.215	0.212	0.213
-11.9	0.221	0.215	0.218	0.218	-	0.229	0.223	0.214	0.222	0.221
-9.3	0.248	0.223	0.222	0.231	-	0.269	0.230	0.240	0.246	0.243
-6.8	0.277	0.260	0.243	0.260	-	0.258	0.258	0.250	0.255	0.258
-4.3	0.289	0.277	0.253	0.273	-	0.289	0.252	0.279	0.273	0.274
-1.7	0.301	0.299	0.299	0.300	-	0.292	0.292	0.290	0.291	0.286
0.8	0.292	0.309	0.284	0.295	-	0.294	0.296	0.292	0.294	0.293
3.4	0.303	0.321	0.309	0.311	-	0.315	0.308	0.302	0.308	0.312
5.9	0.340	0.333	0.331	0.335	-	0.330	0.321	0.330	0.327	0.329
12.9	0.517	0.523	0.517	0.519	-	0.503	0.499	0.497	0.500	0.513
15.5	0.534	0.528	0.557	0.540	-	0.553	0.550	0.518	0.540	0.535
18.0	0.539	0.574	0.552	0.555	-	0.546	0.551	0.550	0.549	0.554
20.5	0.572	0.556	0.551	0.560	-	0.561	0.578	0.561	0.567	0.566
23.1	0.580	0.562	0.584	0.575	-	0.575	0.584	0.576	0.578	0.581
25.6	0.614	0.635	0.602	0.617	-	0.622	0.611	0.631	0.621	0.617
28.2	0.616	0.620	0.623	0.620	-	0.649	0.613	0.624	0.628	0.627
30.7	0.642	0.652	0.649	0.647	-	0.638	0.640	0.649	0.642	0.642
33.2	0.658	0.640	0.665	0.654	-	0.651	0.663	0.665	0.660	0.657
35.8	0.664	0.675	0.703	0.681	-	0.675	0.692	0.707	0.692	0.686
38.3	0.696	0.713	0.703	0.704	-	0.707	0.724	0.724	0.718	0.707
40.9	0.703	0.716	0.742	0.720	-	0.724	0.717	0.700	0.714	0.716
43.4	0.710	0.725	0.722	0.719	-	0.727	0.736	0.738	0.734	0.725
45.9	0.745	0.755	0.752	0.751	-	0.763	0.770	0.760	0.765	0.758
48.5	0.776	0.762	0.780	0.773	-	0.772	0.763	0.768	0.768	0.770
51.0	0.791	0.799	0.763	0.784	-	0.786	0.786	0.784	0.785	0.782
53.6	0.796	0.783	0.811	0.797	-	0.803	0.796	0.780	0.793	0.797
56.1	0.816	0.795	0.814	0.808	-	0.824	0.824	0.811	0.820	0.818
58.6	0.843	0.829	0.839	0.837	-	0.831	0.828	0.825	0.828	0.832
61.2	0.857	0.857	0.866	0.860	-	0.857	0.863	0.856	0.859	0.862
69.3	1.038	1.014	1.030	1.027	-	1.036	1.027	1.012	1.025	1.028
71.8	1.050	1.032	1.027	1.036	-	1.037	1.020	1.034	1.031	1.039
74.4	1.043	1.059	1.044	1.048	-	1.050	1.053	1.062	1.055	1.056
76.9	1.060	1.075	1.067	1.067	-	1.071	1.066	1.071	1.069	1.070
79.4	1.079	1.094	1.085	1.086	-	1.079	1.088	1.076	1.081	1.082
82.0	1.117	1.105	1.114	1.112	-	1.086	1.084	1.111	1.094	1.105
84.5	1.114	1.117	1.092	1.108	-	1.104	1.122	1.123	1.117	1.112
87.1	1.119	1.140	1.131	1.130	-	1.109	1.123	1.134	1.122	1.127
89.6	1.143	1.159	1.147	1.150	-	1.138	1.130	1.132	1.133	1.145

RUN NUMBER: 20 BUNDLE: B-5R REYNOLDS NO. 3.24E+04
AVERAGE FLOW RATE: 0.0120 M**3/SEC AVERAGE TEMPERATE 49.9 DEG.C

TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)									
	TAP NUMBER 1	2	3	NORTH SIDE AVERAGE	-	4	5	6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.004	-0.012	0.008	0.000	-	0.061	0.038	0.042	0.047	0.025
-22.9	0.030	0.061	0.065	0.052	-	0.103	0.148	0.129	0.127	0.096
-14.4	0.640	0.674	0.701	0.672	-	0.733	0.714	0.692	0.713	0.694
-11.9	0.713	0.731	0.716	0.720	-	0.728	0.713	0.775	0.739	0.729
-9.3	0.763	0.791	0.767	0.774	-	0.766	0.786	0.778	0.777	0.762
-6.8	0.786	0.801	0.815	0.800	-	0.872	0.811	0.820	0.834	0.815
-4.3	0.844	0.833	0.861	0.846	-	0.856	0.875	0.889	0.873	0.857
-1.7	0.874	0.895	0.896	0.888	-	0.924	0.895	0.916	0.912	0.904
0.8	0.922	0.935	0.918	0.925	-	0.945	0.921	0.958	0.941	0.930
3.4	0.960	0.979	0.958	0.965	-	0.992	1.003	0.982	0.992	0.982
5.9	1.023	1.011	1.036	1.023	-	1.069	1.066	1.070	1.068	1.039
12.9	1.564	1.595	1.612	1.590	-	1.616	1.614	1.643	1.624	1.601
15.5	1.623	1.615	1.616	1.618	-	1.623	1.615	1.664	1.634	1.625
18.0	1.648	1.658	1.666	1.657	-	1.684	1.650	1.640	1.658	1.668
20.5	1.705	1.675	1.712	1.697	-	1.710	1.693	1.728	1.710	1.704
23.1	1.753	1.745	1.751	1.750	-	1.751	1.771	1.760	1.761	1.738
25.6	1.790	1.824	1.805	1.806	-	1.806	1.776	1.792	1.792	1.795
28.2	1.831	1.828	1.850	1.836	-	1.837	1.837	1.844	1.840	1.840
30.7	1.871	1.850	1.894	1.871	-	1.899	1.896	1.880	1.891	1.883
33.2	1.934	1.931	1.930	1.932	-	1.947	1.903	1.924	1.925	1.931
35.8	1.998	1.972	1.980	1.983	-	1.969	1.982	1.980	1.977	1.977
38.3	2.025	2.018	2.028	2.023	-	2.030	2.031	2.018	2.026	2.028
40.9	2.073	2.076	2.094	2.081	-	2.050	2.073	2.059	2.060	2.077
43.4	2.114	2.145	2.087	2.115	-	2.122	2.102	2.091	2.105	2.111
45.9	2.129	2.166	2.149	2.148	-	2.164	2.167	2.169	2.167	2.163
48.5	2.195	2.211	2.202	2.203	-	2.201	2.207	2.215	2.208	2.207
51.0	2.229	2.237	2.228	2.231	-	2.246	2.250	2.244	2.247	2.241
53.6	2.289	2.258	2.291	2.280	-	2.288	2.298	2.285	2.290	2.286
56.1	2.346	2.344	2.330	2.340	-	2.357	2.373	2.347	2.359	2.345
58.6	2.375	2.376	2.387	2.379	-	2.408	2.416	2.396	2.407	2.388
61.2	2.431	2.443	2.448	2.441	-	2.511	2.524	2.506	2.514	2.471
69.3	2.963	2.978	2.981	2.974	-	3.027	3.015	3.006	3.016	2.991
71.8	3.026	3.038	3.014	3.026	-	3.011	3.042	3.058	3.037	3.031
74.4	3.052	3.085	3.075	3.070	-	3.078	3.057	3.073	3.069	3.067
76.9	3.102	3.115	3.121	3.112	-	3.111	3.128	3.102	3.114	3.109
79.4	3.152	3.132	3.172	3.152	-	3.154	3.137	3.141	3.144	3.141
82.0	3.201	3.198	3.225	3.208	-	3.206	3.194	3.197	3.199	3.212
84.5	3.226	3.240	3.265	3.244	-	3.253	3.247	3.234	3.244	3.241
87.1	3.291	3.309	3.300	3.300	-	3.305	3.298	3.289	3.297	3.290
89.6	3.319	3.310	3.342	3.324	-	3.380	3.371	3.364	3.372	3.337

RUN NUMBER 20 BUNDLE B-5R REYNOLDS NO 3.24E+04
AVERAGE FLOW RATE 0.0120 M**3/SEC AVERAGE TEMPERATE 49.9 DEG C

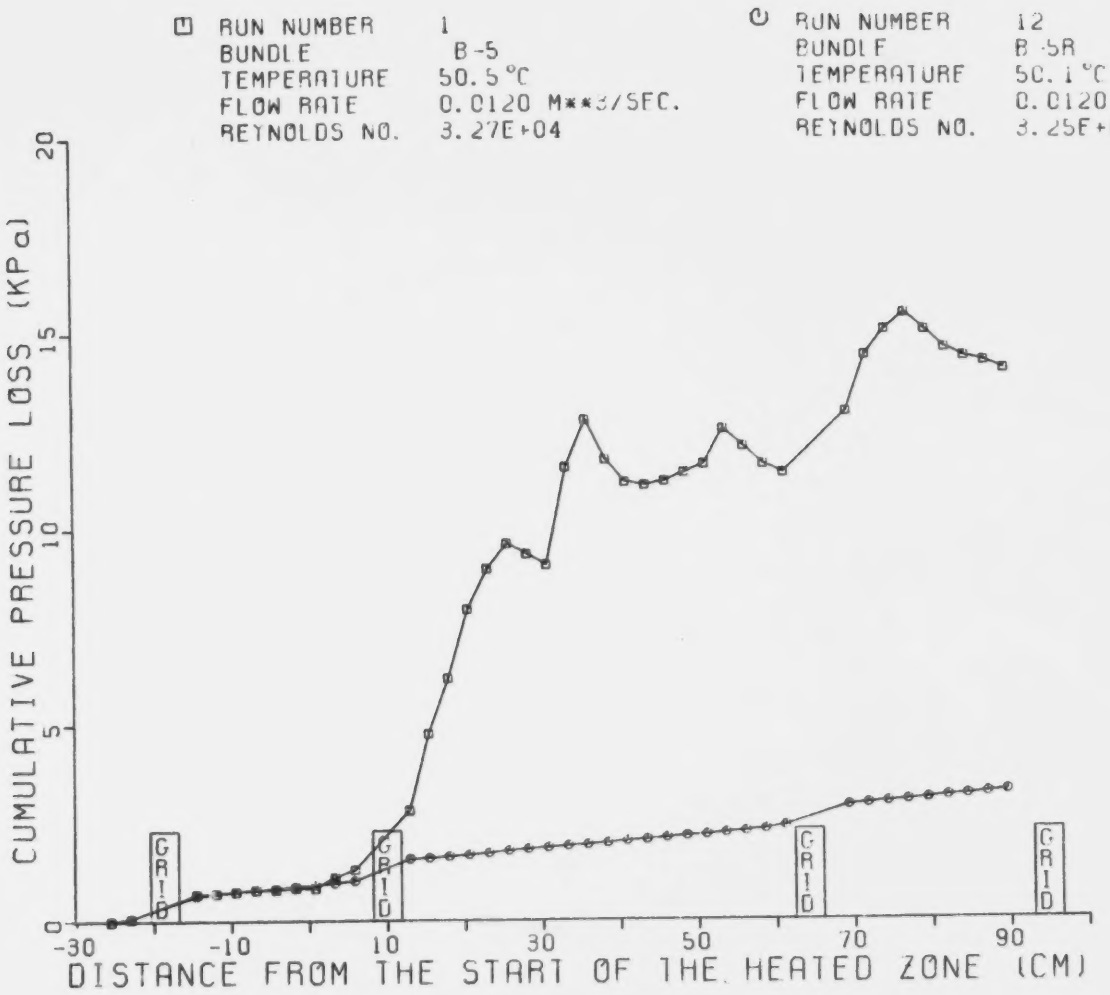
TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE		10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.061	0.034	0.025	0.040	-	0.035	0.002	0.007	0.014	0.025
-22.9	0.139	0.123	0.097	0.119	-	0.112	0.071	0.078	0.087	0.096
-14.4	0.711	0.700	0.711	0.707	-	0.690	0.710	0.647	0.682	0.694
-11.9	0.714	0.708	0.748	0.723	-	0.723	0.727	0.747	0.733	0.729
-9.3	0.764	0.773	0.792	0.776	-	0.852	0.763	0.788	0.801	0.782
-6.8	0.819	0.817	0.801	0.813	-	0.815	0.817	0.805	0.812	0.815
-4.3	0.863	0.862	0.878	0.868	-	0.844	0.849	0.833	0.842	0.857
-1.7	0.917	0.866	0.916	0.900	-	0.902	0.908	0.934	0.915	0.904
0.8	0.960	0.916	0.927	0.934	-	0.898	0.933	0.924	0.919	0.930
3.4	0.985	0.986	1.007	0.993	-	0.974	0.993	0.965	0.978	0.982
5.9	1.053	1.041	1.041	1.045	-	1.034	1.007	1.017	1.019	1.039
12.9	1.617	1.631	1.588	1.612	-	1.583	1.572	1.578	1.577	1.601
15.5	1.616	1.636	1.658	1.637	-	1.615	1.618	1.599	1.611	1.625
18.0	1.681	1.702	1.685	1.689	-	1.665	1.654	1.689	1.669	1.668
20.5	1.693	1.704	1.691	1.696	-	1.723	1.716	1.692	1.710	1.704
23.1	1.717	1.722	1.724	1.721	-	1.745	1.723	1.691	1.720	1.738
25.6	1.816	1.781	1.776	1.791	-	1.794	1.804	1.780	1.793	1.795
28.2	1.833	1.841	1.830	1.835	-	1.882	1.842	1.829	1.851	1.840
30.7	1.881	1.885	1.896	1.887	-	1.891	1.869	1.882	1.881	1.883
33.2	1.921	1.926	1.930	1.926	-	1.926	1.959	1.945	1.943	1.931
35.8	1.989	1.988	1.971	1.983	-	1.961	1.982	1.955	1.966	1.977
38.3	2.001	2.038	2.080	2.039	-	2.014	2.030	2.027	2.024	2.028
40.9	2.068	2.054	2.139	2.087	-	2.087	2.075	2.076	2.079	2.077
43.4	2.106	2.105	2.089	2.100	-	2.132	2.125	2.112	2.123	2.111
45.9	2.156	2.160	2.184	2.167	-	2.153	2.179	2.178	2.170	2.163
48.5	2.202	2.235	2.222	2.220	-	2.187	2.197	2.210	2.198	2.207
51.0	2.236	2.272	2.230	2.246	-	2.219	2.259	2.245	2.241	2.241
53.6	2.319	2.284	2.279	2.294	-	2.287	2.283	2.275	2.282	2.286
56.1	2.363	2.342	2.340	2.349	-	2.333	2.340	2.330	2.334	2.345
58.6	2.398	2.402	2.382	2.394	-	2.379	2.362	2.375	2.372	2.388
61.2	2.488	2.477	2.462	2.476	-	2.472	2.452	2.437	2.454	2.471
69.3	3.005	3.009	2.978	2.997	-	2.985	2.970	2.977	2.978	2.991
71.8	3.071	3.034	3.021	3.042	-	3.035	3.015	3.008	3.019	3.031
74.4	3.059	3.062	3.069	3.063	-	3.065	3.063	3.064	3.064	3.067
76.9	3.107	3.113	3.124	3.115	-	3.099	3.089	3.093	3.094	3.109
79.4	3.086	3.165	3.138	3.130	-	3.178	3.119	3.120	3.139	3.141
82.0	3.338	3.196	3.210	3.248	-	3.197	3.194	3.185	3.192	3.212
84.5	3.257	3.223	3.244	3.241	-	3.237	3.239	3.232	3.236	3.241
87.1	3.290	3.287	3.277	3.285	-	3.281	3.265	3.291	3.279	3.290
89.6	3.343	3.315	3.343	3.333	-	3.332	3.308	3.323	3.321	3.337

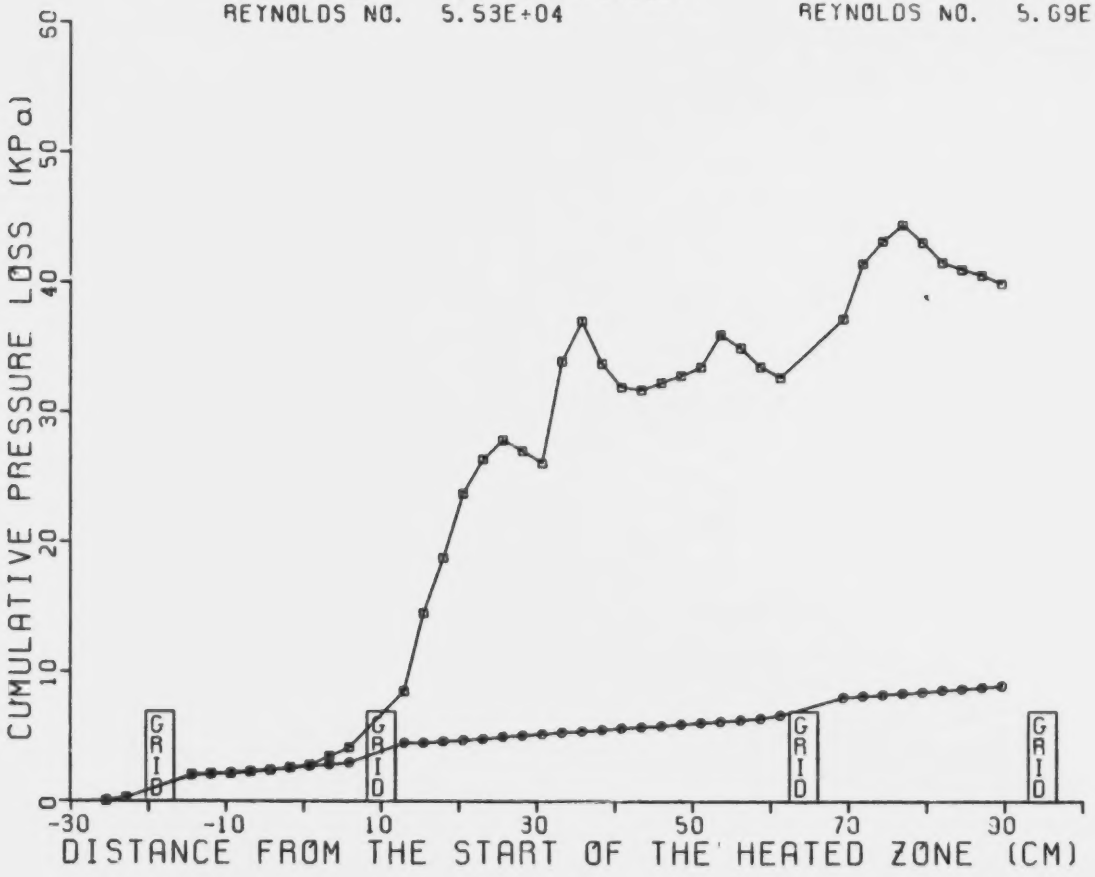
RUN NUMBER 21 BUNDLE B-5R REYNOLDS NO. 1.73E+04
AVERAGE FLOW RATE 0.0064 M**3/SEC AVERAGE TEMPERATE 49.9 DEG C

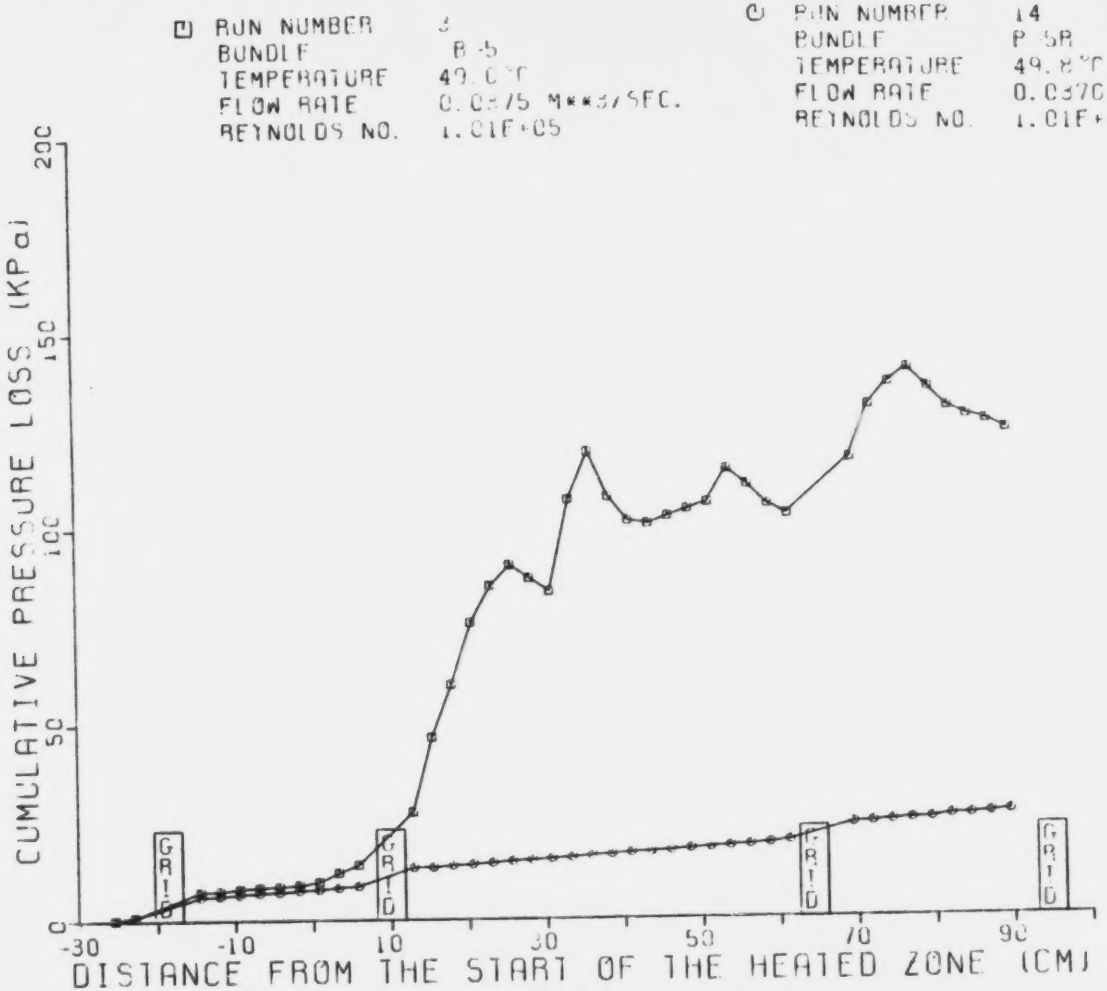
TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 1	2	3	NORTH SIDE AVERAGE		4	TAP NUMBER 5	6	EAST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	-0.001	0.012	0.009	0.006	-	0.031	0.029	0.021	0.027	0.018
-22.9	0.009	0.001	0.009	0.006	-	0.050	0.063	0.032	0.048	0.035
-14.4	0.184	0.184	0.213	0.194	-	0.214	0.194	0.212	0.207	0.206
-11.9	0.214	0.213	0.215	0.214	-	0.240	0.203	0.218	0.220	0.218
-9.3	0.231	0.245	0.230	0.235	-	0.243	0.214	0.236	0.231	0.243
-6.8	0.249	0.259	0.252	0.254	-	0.267	0.235	0.287	0.263	0.257
-4.3	0.296	0.274	0.290	0.287	-	0.285	0.284	0.283	0.284	0.271
-1.7	0.270	0.299	0.305	0.291	-	0.281	0.302	0.288	0.290	0.286
0.8	0.273	0.289	0.299	0.287	-	0.287	0.294	0.303	0.295	0.290
3.4	0.294	0.325	0.321	0.313	-	0.303	0.325	0.299	0.309	0.310
5.9	0.323	0.336	0.323	0.327	-	0.319	0.329	0.336	0.328	0.329
12.9	0.496	0.501	0.487	0.495	-	0.508	0.518	0.510	0.512	0.501
15.5	0.492	0.526	0.501	0.507	-	0.523	0.530	0.545	0.533	0.520
18.0	0.547	0.520	0.541	0.536	-	0.537	0.524	0.541	0.534	0.532
20.5	0.521	0.550	0.545	0.538	-	0.555	0.542	0.547	0.548	0.546
23.1	0.548	0.571	0.555	0.558	-	0.552	0.554	0.559	0.555	0.559
25.6	0.595	0.559	0.591	0.582	-	0.564	0.571	0.554	0.563	0.572
28.2	0.575	0.580	0.600	0.585	-	0.575	0.599	0.585	0.586	0.585
30.7	0.599	0.591	0.576	0.589	-	0.607	0.603	0.590	0.600	0.599
33.2	0.577	0.618	0.607	0.601	-	0.616	0.600	0.602	0.606	0.608
35.8	0.614	0.611	0.584	0.603	-	0.612	0.592	0.593	0.599	0.599
38.3	0.628	0.605	0.603	0.612	-	0.630	0.609	0.619	0.619	0.610
40.9	0.606	0.621	0.609	0.612	-	0.612	0.591	0.625	0.610	0.616
43.4	0.650	0.639	0.621	0.637	-	0.614	0.632	0.631	0.626	0.638
45.9	0.678	0.679	0.705	0.687	-	0.663	0.663	0.691	0.672	0.675
48.5	0.676	0.697	0.692	0.689	-	0.671	0.695	0.699	0.688	0.690
51.0	0.680	0.699	0.715	0.698	-	0.712	0.685	0.691	0.696	0.695
53.6	0.711	0.723	0.696	0.710	-	0.701	0.733	0.720	0.718	0.712
56.1	0.740	0.736	0.731	0.736	-	0.726	0.751	0.733	0.737	0.738
58.6	0.745	0.754	0.744	0.748	-	0.793	0.742	0.758	0.764	0.754
61.2	0.764	0.780	0.802	0.782	-	0.790	0.807	0.789	0.795	0.782
69.3	0.934	0.932	0.938	0.934	-	0.945	0.953	0.941	0.946	0.942
71.8	0.955	0.945	0.948	0.949	-	0.958	0.974	0.950	0.961	0.952
74.4	0.964	0.971	0.979	0.971	-	0.984	0.965	0.969	0.973	0.971
76.9	0.997	1.007	0.983	0.995	-	0.989	0.993	0.975	0.986	0.987
79.4	0.996	1.012	0.990	0.999	-	0.985	0.999	1.005	0.996	0.998
82.0	1.032	1.026	1.052	1.036	-	1.032	1.003	1.004	1.013	1.024
84.5	1.041	1.037	1.016	1.031	-	1.036	1.040	1.036	1.037	1.031
87.1	1.041	1.049	1.040	1.043	-	1.061	1.046	1.022	1.043	1.038
89.6	1.071	1.077	1.053	1.067	-	1.080	1.094	1.050	1.075	1.063

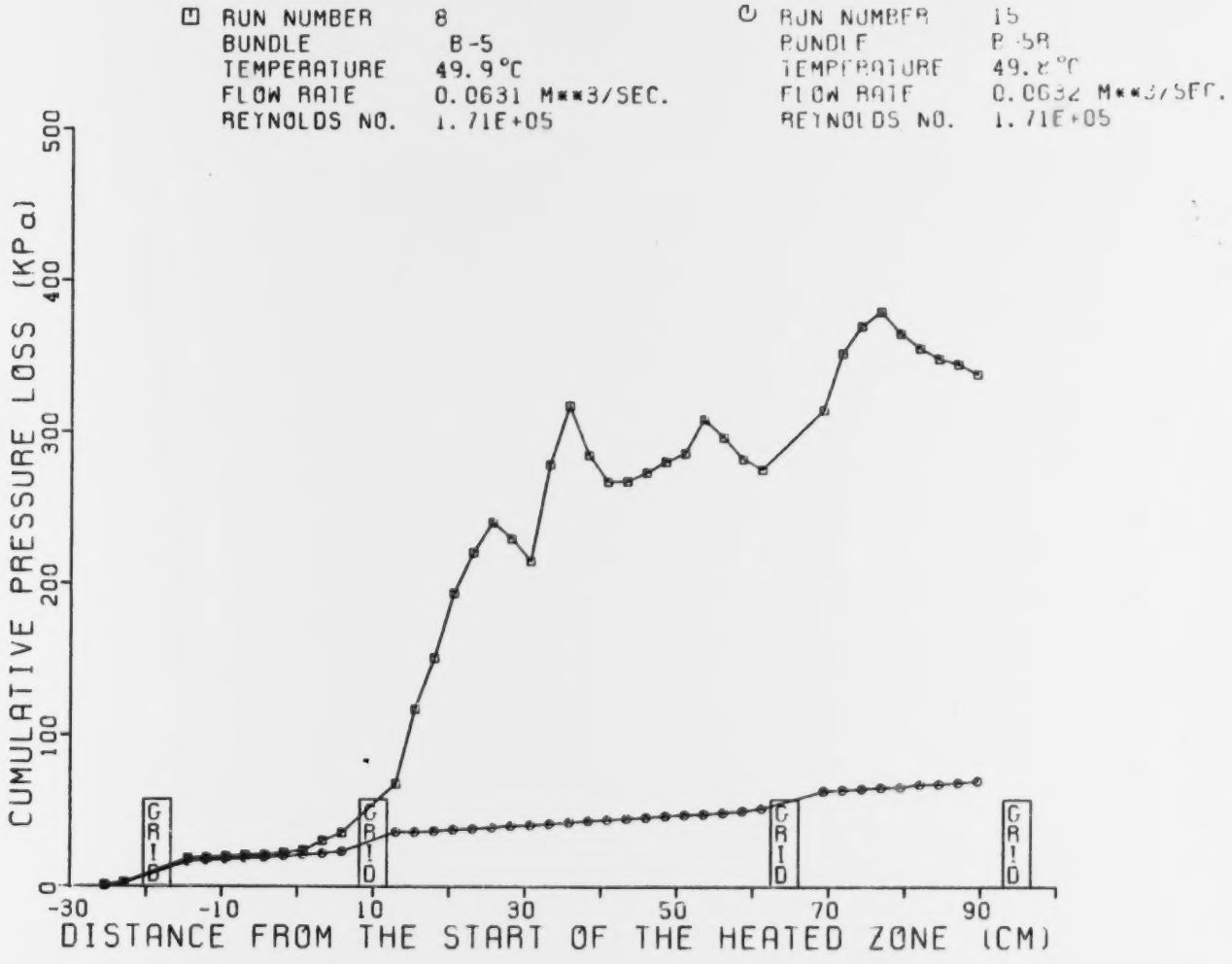
RUN NUMBER: 21 BUNDLE: B-5R REYNOLDS NO. 1.73E+04
AVERAGE FLOW RATE: 0.0064 M**3/SEC. AVERAGE TEMPERATE: 49.9 DEG.C

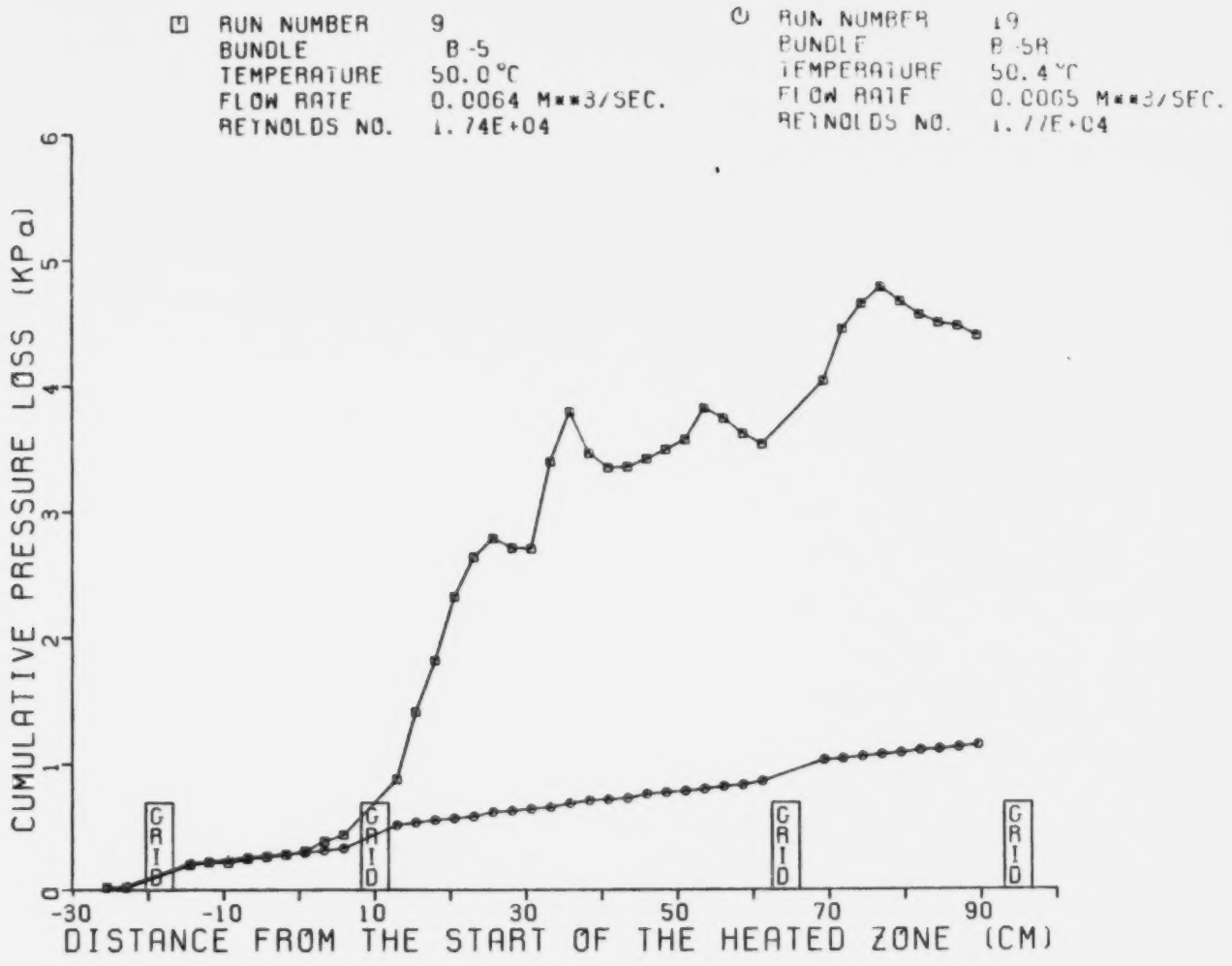
TAP LOCATION (CM)	CUMULATIVE PRESSURE LOSS (KPa)								
	TAP NUMBER 7	8	9	SOUTH SIDE AVERAGE		10	11	12	WEST SIDE AVERAGE	BUNDLE AVERAGE
-25.4	0.032	0.018	0.020	0.023	-	0.040	0.002	-0.001	0.014	0.018
-22.9	0.042	0.050	0.026	0.040	-	0.040	0.060	0.038	0.046	0.035
-14.4	0.230	0.229	0.209	0.223	-	0.199	0.191	0.211	0.200	0.206
-11.9	0.233	0.217	0.224	0.225	-	0.213	0.225	0.205	0.214	0.218
-9.3	0.229	0.256	0.261	0.249	-	0.272	0.220	0.272	0.255	0.243
-6.8	0.275	0.239	0.274	0.263	-	0.262	0.233	0.246	0.247	0.257
-4.3	0.267	0.271	0.274	0.271	-	0.256	0.229	0.239	0.241	0.271
-1.7	0.281	0.300	0.276	0.286	-	0.271	0.259	0.306	0.279	0.286
0.8	0.299	0.280	0.293	0.291	-	0.279	0.296	0.289	0.288	0.290
3.4	0.324	0.316	0.308	0.316	-	0.317	0.305	0.285	0.303	0.310
5.9	0.333	0.332	0.337	0.334	-	0.346	0.325	0.310	0.327	0.329
12.9	0.504	0.510	0.506	0.507	-	0.487	0.490	0.490	0.489	0.501
15.5	0.497	0.525	0.535	0.519	-	0.532	0.527	0.505	0.521	0.520
18.0	0.520	0.533	0.526	0.526	-	0.520	0.560	0.520	0.533	0.532
20.5	0.570	0.565	0.544	0.559	-	0.537	0.548	0.526	0.537	0.546
23.1	0.572	0.561	0.573	0.569	-	0.588	0.540	0.538	0.555	0.559
25.6	0.578	0.584	0.564	0.576	-	0.560	0.573	0.571	0.568	0.572
28.2	0.589	0.593	0.579	0.587	-	0.581	0.584	0.583	0.583	0.585
30.7	0.624	0.616	0.575	0.605	-	0.625	0.585	0.596	0.602	0.599
33.2	0.607	0.621	0.616	0.615	-	0.608	0.617	0.601	0.609	0.608
35.8	0.612	0.583	0.598	0.598	-	0.595	0.596	0.597	0.596	0.599
38.3	0.581	0.618	0.606	0.601	-	0.610	0.607	0.605	0.607	0.610
40.9	0.629	0.651	0.631	0.637	-	0.601	0.619	0.601	0.607	0.616
43.4	0.647	0.638	0.648	0.644	-	0.653	0.648	0.634	0.645	0.638
45.9	0.681	0.675	0.651	0.669	-	0.671	0.663	0.682	0.672	0.675
48.5	0.689	0.705	0.698	0.697	-	0.692	0.674	0.689	0.685	0.690
51.0	0.680	0.726	0.685	0.697	-	0.684	0.695	0.688	0.689	0.695
53.6	0.735	0.701	0.703	0.713	-	0.672	0.741	0.709	0.707	0.712
56.1	0.762	0.728	0.756	0.749	-	0.725	0.724	0.739	0.729	0.738
58.6	0.732	0.747	0.768	0.749	-	0.752	0.754	0.757	0.754	0.754
61.2	0.778	0.791	0.780	0.783	-	0.766	0.775	0.763	0.768	0.782
69.3	0.937	0.956	0.947	0.947	-	0.945	0.931	0.941	0.939	0.942
71.8	0.947	0.953	0.951	0.950	-	0.927	0.969	0.942	0.946	0.952
74.4	0.963	0.967	0.961	0.964	-	0.985	0.976	0.973	0.978	0.971
76.9	0.952	0.986	0.995	0.978	-	1.001	0.989	0.980	0.990	0.987
79.4	0.989	1.008	0.994	0.997	-	1.004	0.993	1.004	1.000	0.998
82.0	1.050	0.991	1.034	1.025	-	1.018	1.019	1.023	1.020	1.024
84.5	1.043	1.012	1.021	1.025	-	1.051	1.014	1.025	1.030	1.031
87.1	1.035	1.045	1.037	1.039	-	1.042	1.039	1.000	1.027	1.038
89.6	1.071	1.037	1.049	1.052	-	1.088	1.037	1.051	1.059	1.063


RUN NUMBER 1
BUNDLE B-5
TEMPERATURE 50.5 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.27E+04
RUN NUMBER 12
BUNDLE B-5R
TEMPERATURE 50.1 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.25E+04
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

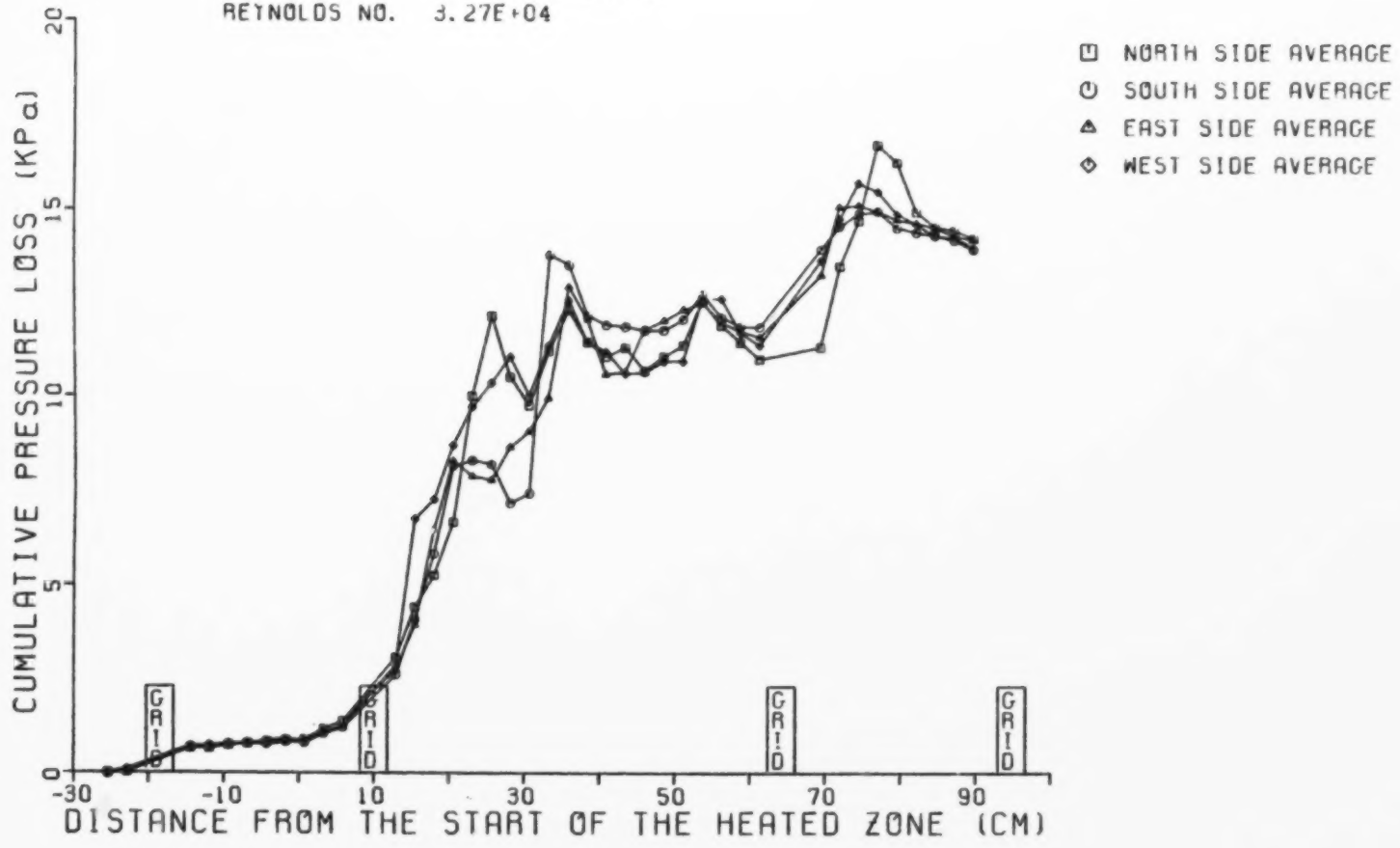

□ RUN NUMBER 2
BUNDLE B-5
TEMPERATURE 49.8 °C
FLOW RATE 0.0205 M**3/SEC.
REYNOLDS NO. 5.53E+04
○ RUN NUMBER 18
BUNDLE B-5R
TEMPERATURE 51.1 °C
FLOW RATE 0.0207 M**3/SEC.
REYNOLDS NO. 5.69E+04
CUMULATIVE PRESSURE LOSS (KPa)
0
10
20
30
40
50
60
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

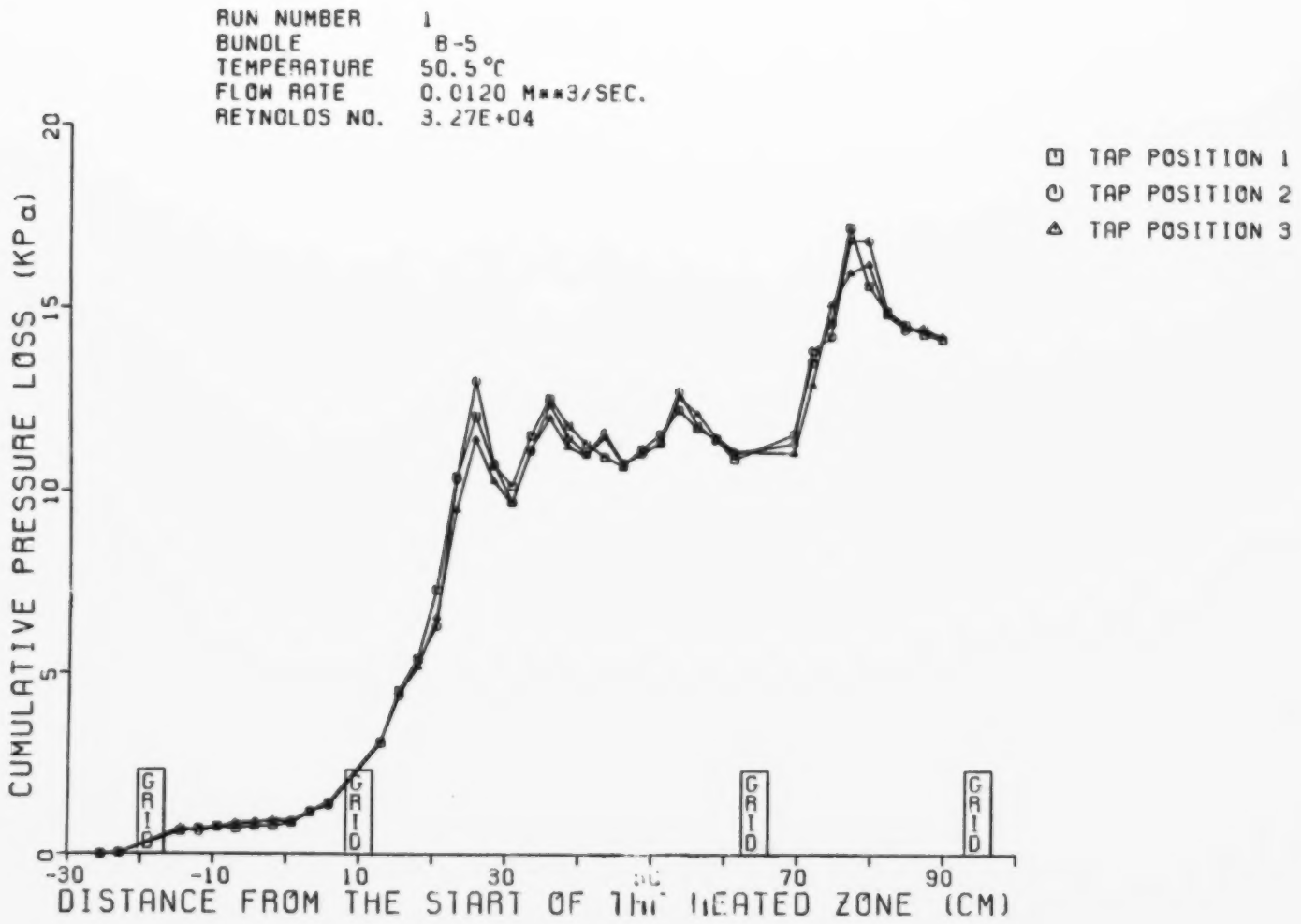

RUN NUMBER 3
BUNDLE B-5
TEMPERATURE 49.0°C
FLOW RATE 0.0375 M**3/SEC.
REYNOLDS NO. 1.01E+05
RUN NUMBER 14
BUNDLE B-5R
TEMPERATURE 49.8°C
FLOW RATE 0.0370 M**3/SEC.
REYNOLDS NO. 1.01E+05
CUMULATIVE PRESSURE LOSS (KPa)
0
50
100
150
200
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

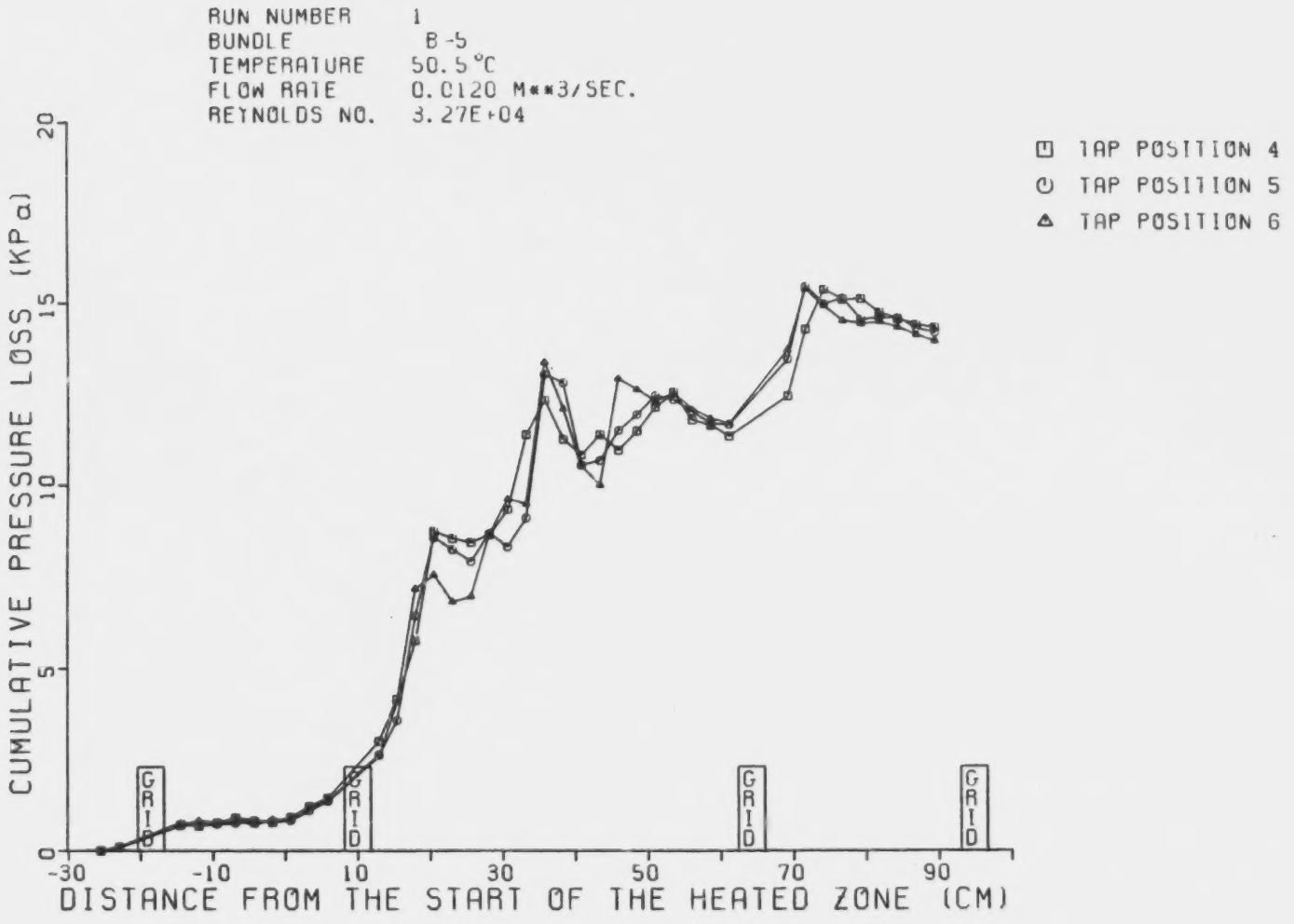

□ RUN NUMBER 8
BUNDLE B-5
TEMPERATURE 49.9 °C
FLOW RATE 0.0631 M**3/SEC.
REYNOLDS NO. 1.71E+05
○ RUN NUMBER 15
BUNDLE B-5R
TEMPERATURE 49.8 °C
FLOW RATE 0.0632 M**3/SEC.
REYNOLDS NO. 1.71E+05
CUMULATIVE PRESSURE LOSS (KPa)
0
100
200
300
400
500
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


□ RUN NUMBER 9
BUNDLE B-5
TEMPERATURE 50.0°C
FLOW RATE 0.0064 M**3/SEC.
REYNOLDS NO. 1.74E+04
○ RUN NUMBER 19
BUNDLE B-5R
TEMPERATURE 50.4°C
FLOW RATE 0.0065 M**3/SEC.
REYNOLDS NO. 1.77E+04
CUMULATIVE PRESSURE LOSS (KPa)
0
1
2
3
4
5
6
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

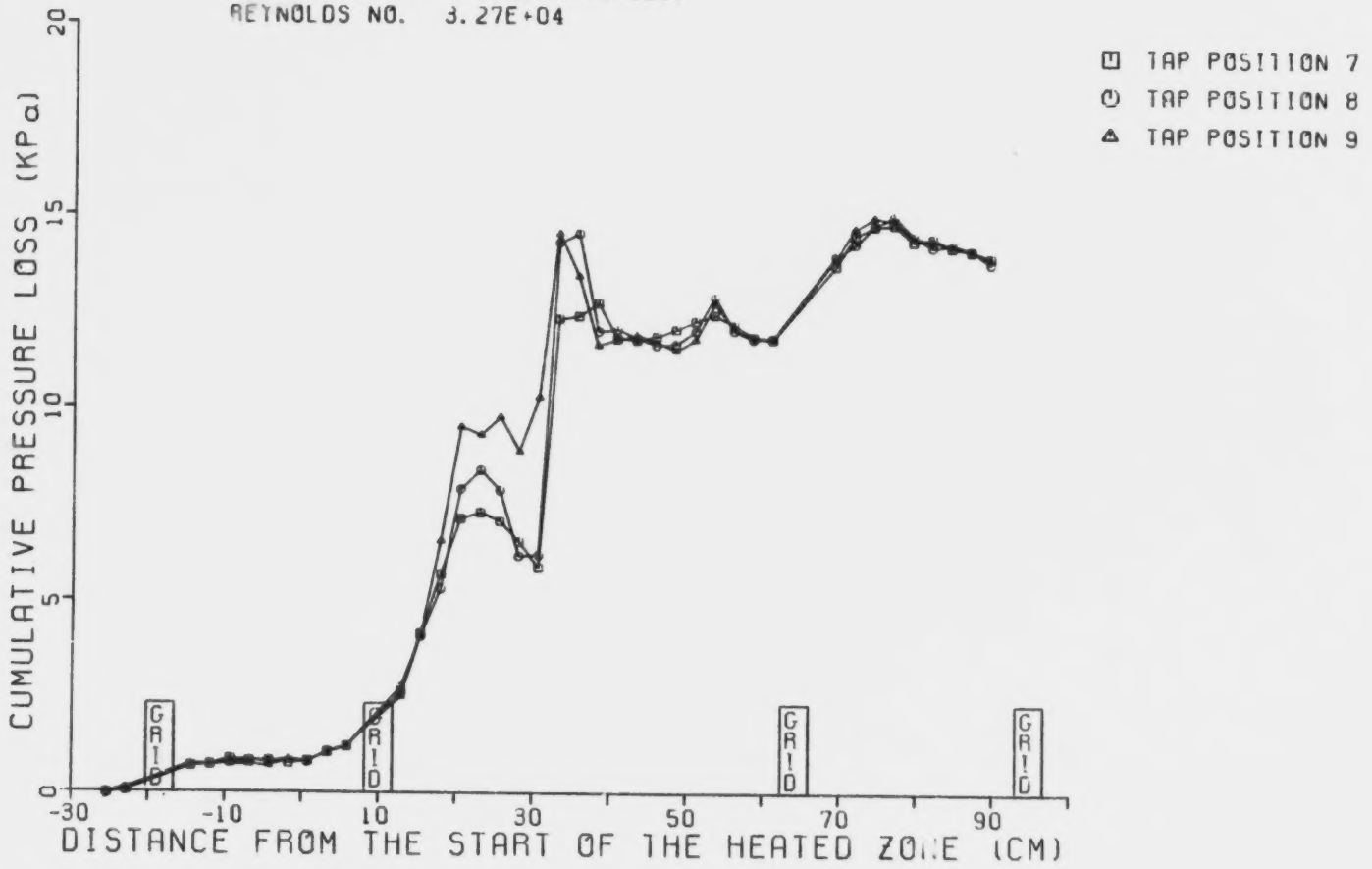
RUN NUMBER 1
BUNDLE B-5
TEMPERATURE 50.5 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.27E+04




RUN NUMBER 1
BUNDLE B-5
TEMPERATURE 50.5°C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.27E+04
TAP POSITION 1
TAP POSITION 2
TAP POSITION 3
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
GRID
GRID
GRID
GRID
-30
-10
10
30
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

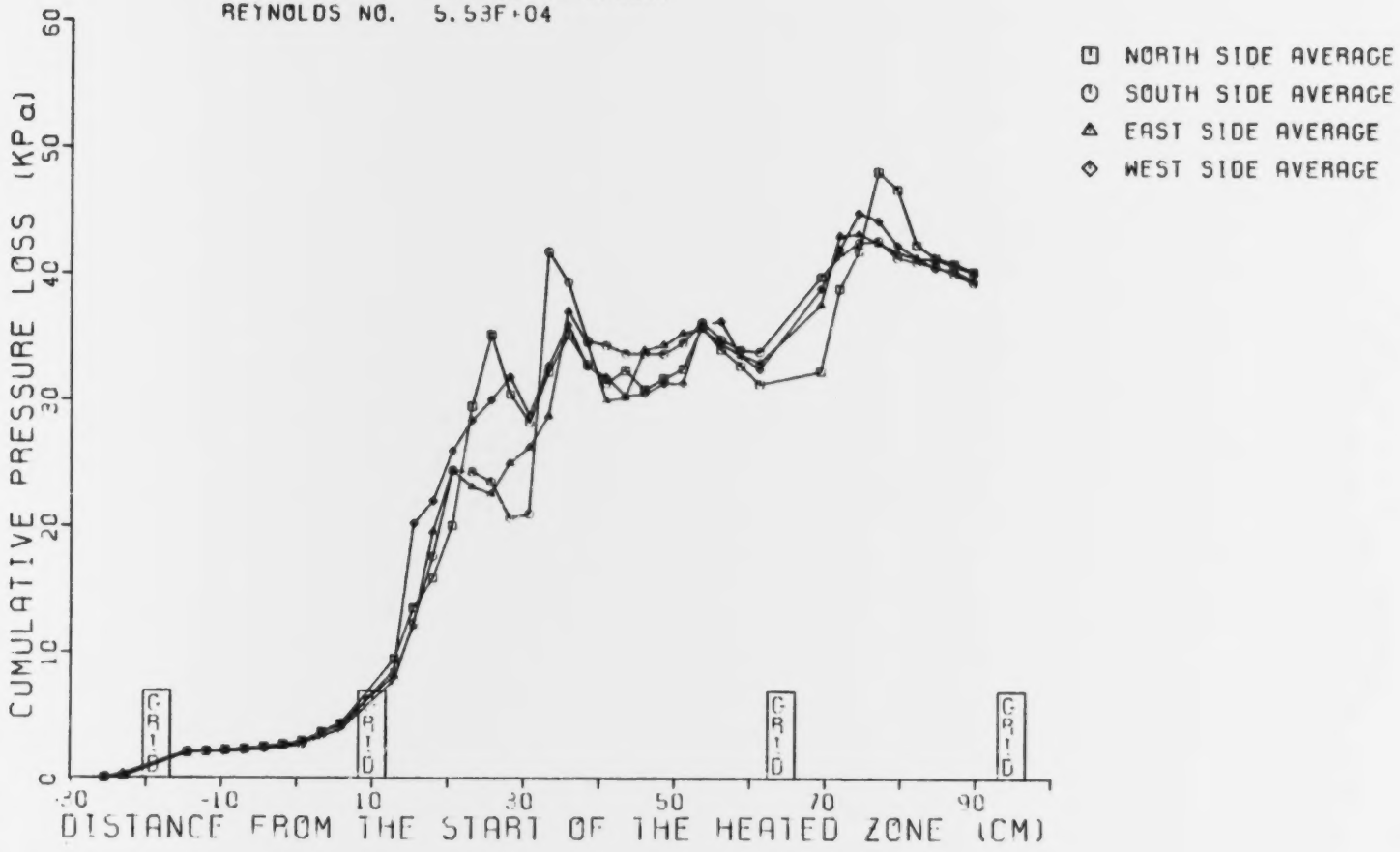

RUN NUMBER 1
BUNDLE B-5
TEMPERATURE 50.5 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.27E+04
TAP POSITION 4
TAP POSITION 5
TAP POSITION 6
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

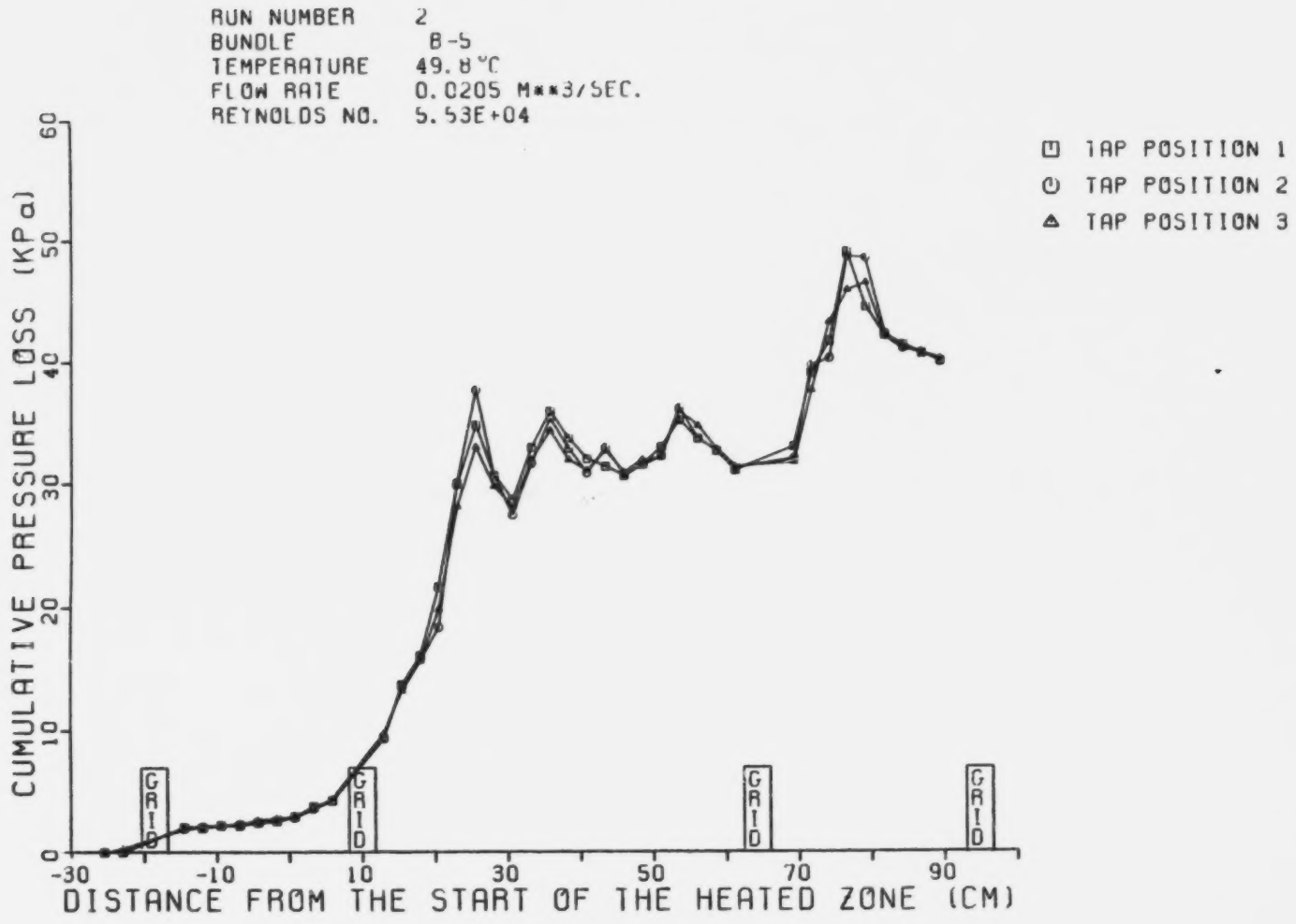
RUN NUMBER 1
BUNDLE B-5
TEMPERATURE 50.5 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.27E+04

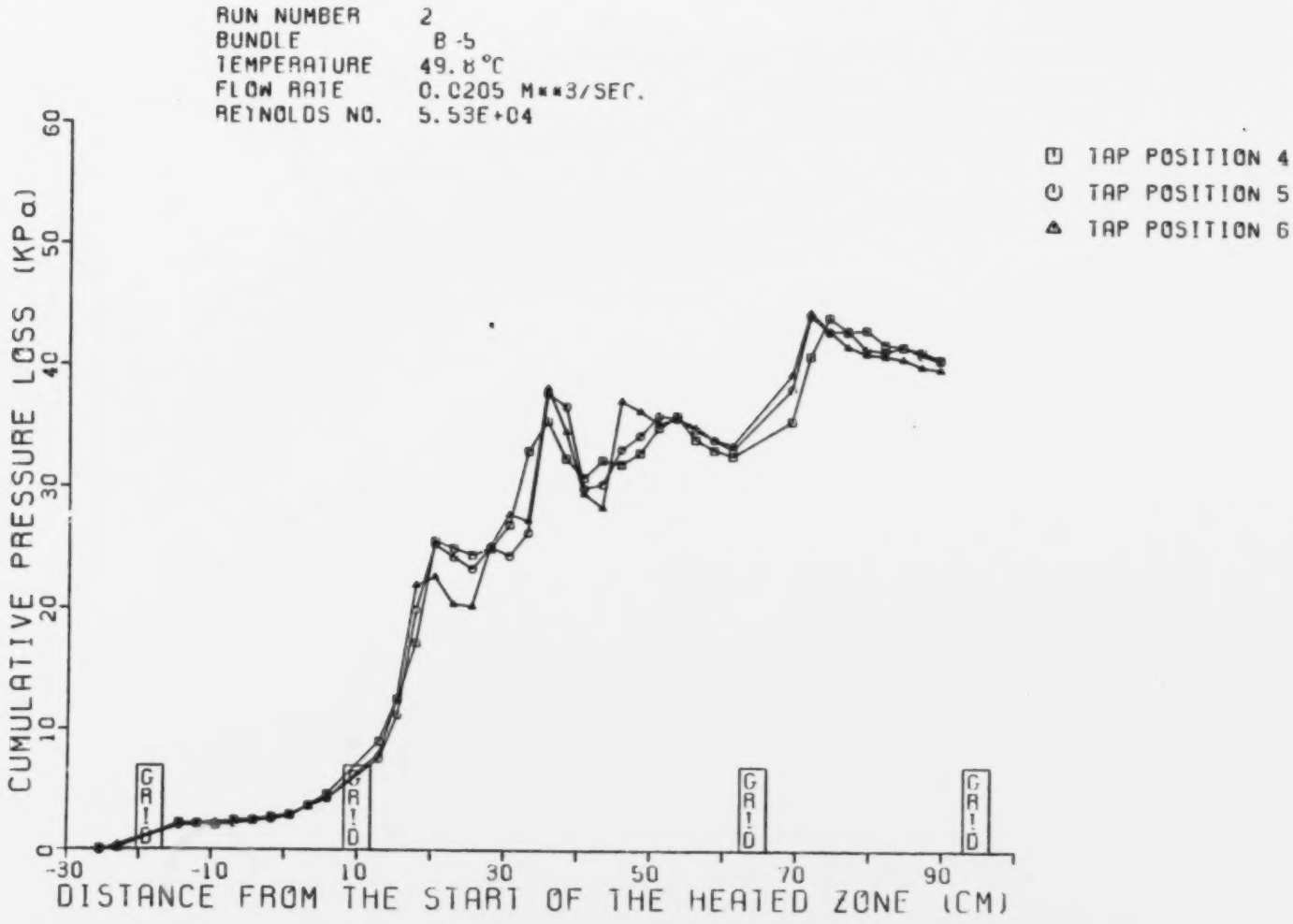


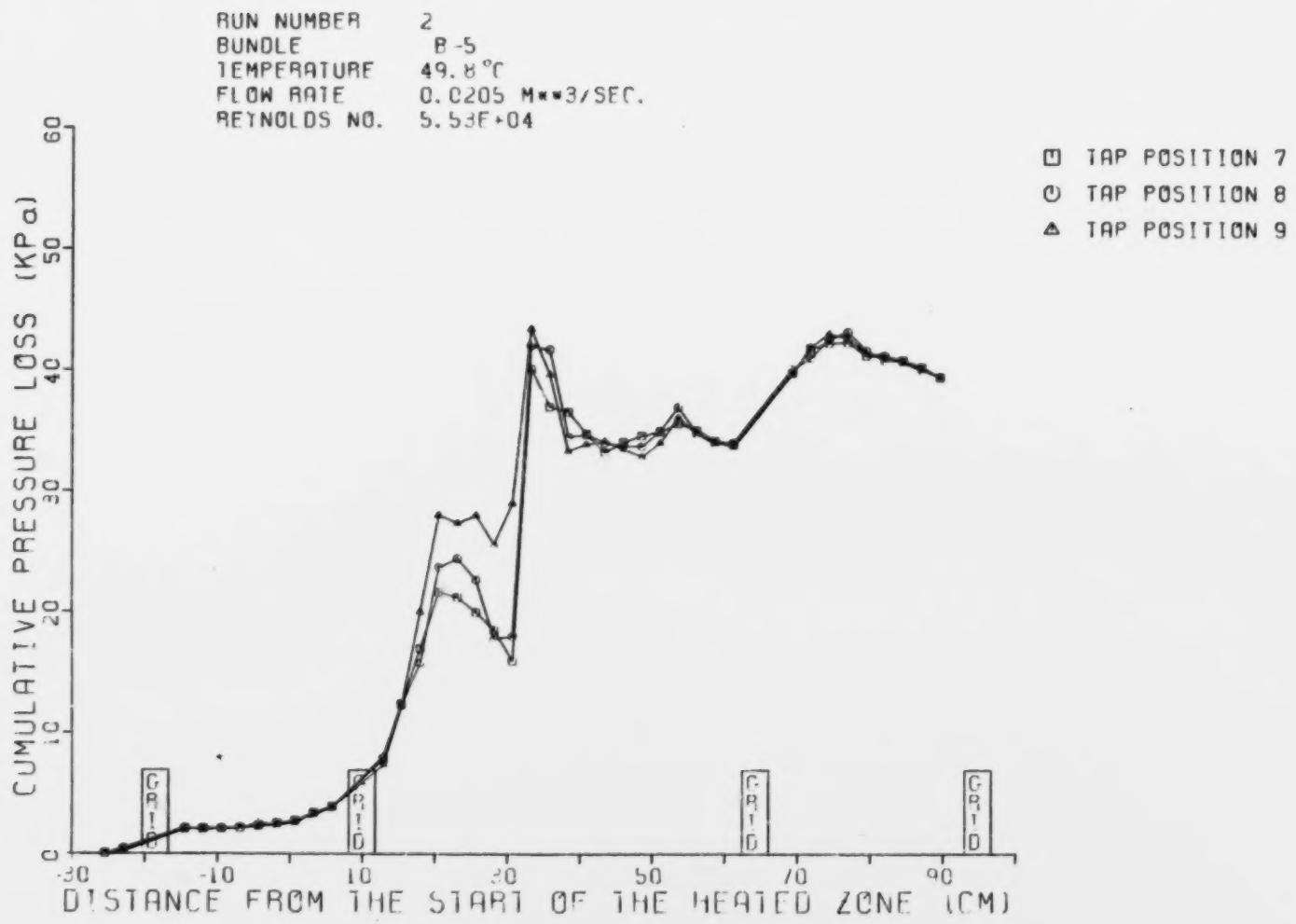
RUN NUMBER 1
BUNDLE B-5
TEMPERATURE 50.5 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.27E+04

RUN NUMBER 2
BUNDLE B-5
TEMPERATURE 49.8 °C
FLOW RATE 0.0205 M**3/SEC.
REYNOLDS NO. 5.53F+04

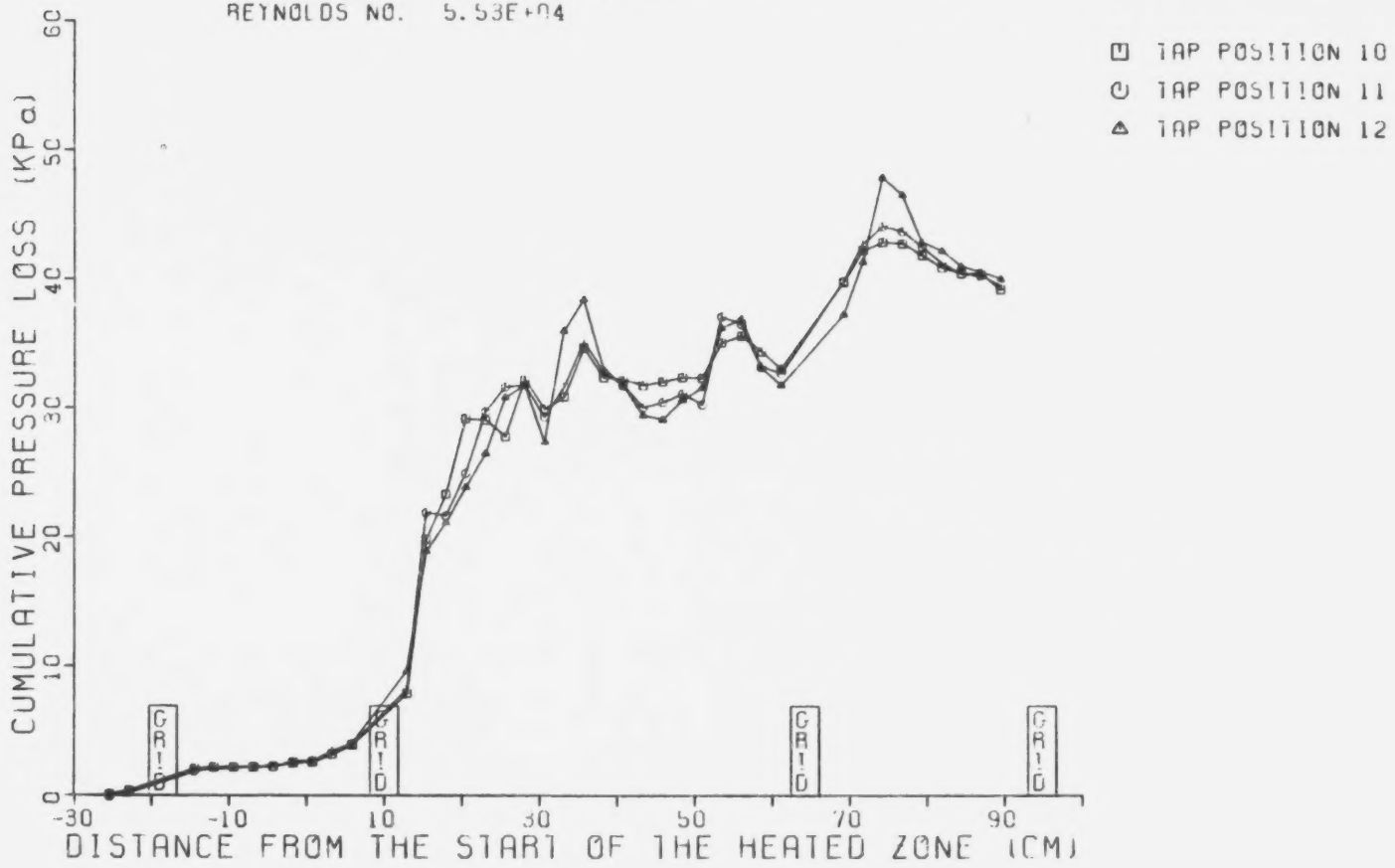


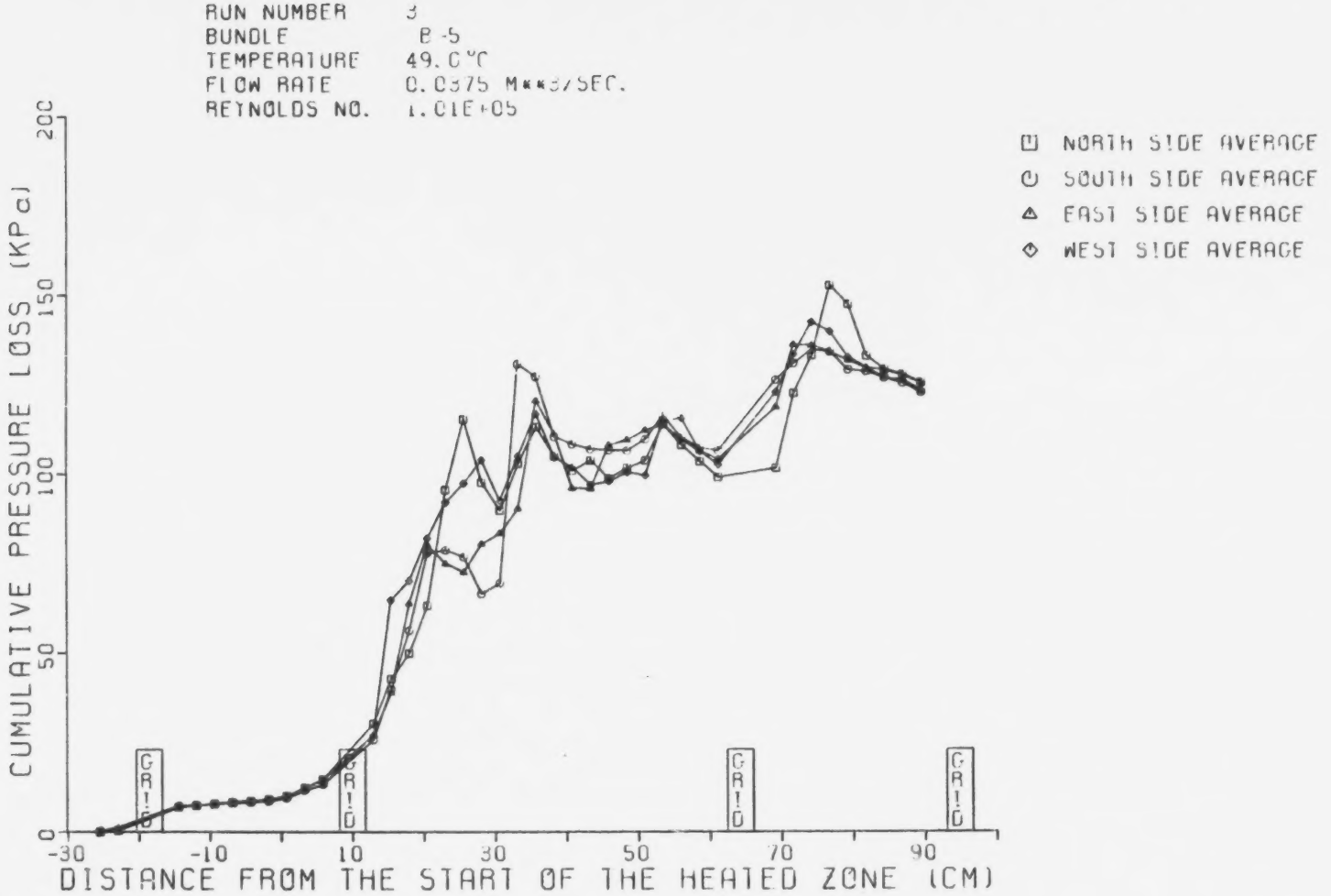

RUN NUMBER 2
BUNDLE B-5
TEMPERATURE 49.8°C
FLOW RATE 0.0205 M**3/SEC.
REYNOLDS NO. 5.53E+04
TAP POSITION 1
TAP POSITION 2
TAP POSITION 3
CUMULATIVE PRESSURE LOSS (KPa)
0
10
20
30
40
50
60
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


RUN NUMBER 2
BUNDLE B-5
TEMPERATURE 49.8 °C
FLOW RATE 0.0205 M**3/SEC.
REYNOLDS NO. 5.53E+04
TAP POSITION 4
TAP POSITION 5
TAP POSITION 6
CUMULATIVE PRESSURE LOSS (KPa)
0
10
20
30
40
50
60
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

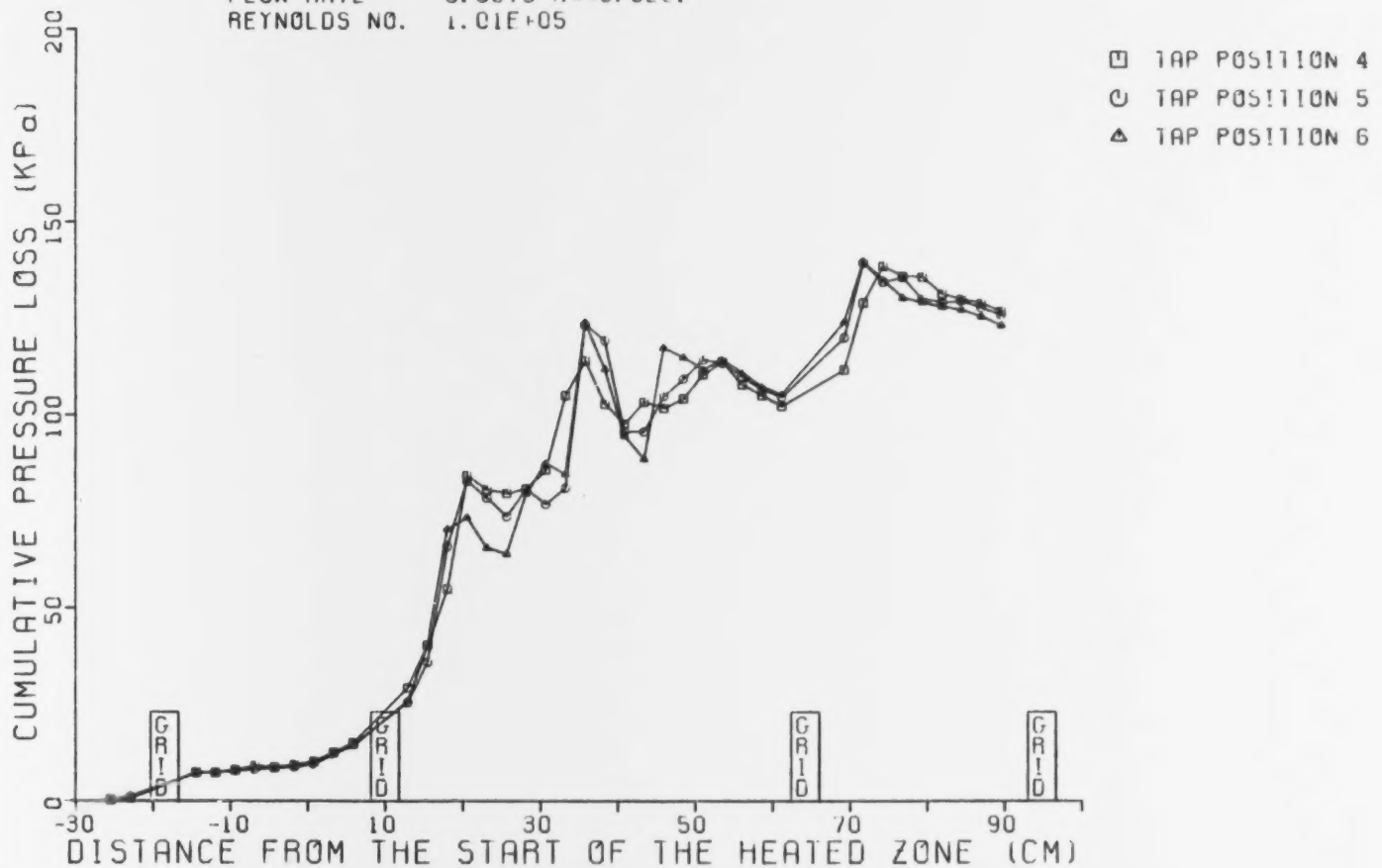

RUN NUMBER 2
BUNDLE B-5
TEMPERATURE 49.8°C
FLOW RATE 0.0205 M**3/SEC.
REYNOLDS NO. 5.53E+04
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
10
20
30
40
50
60
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

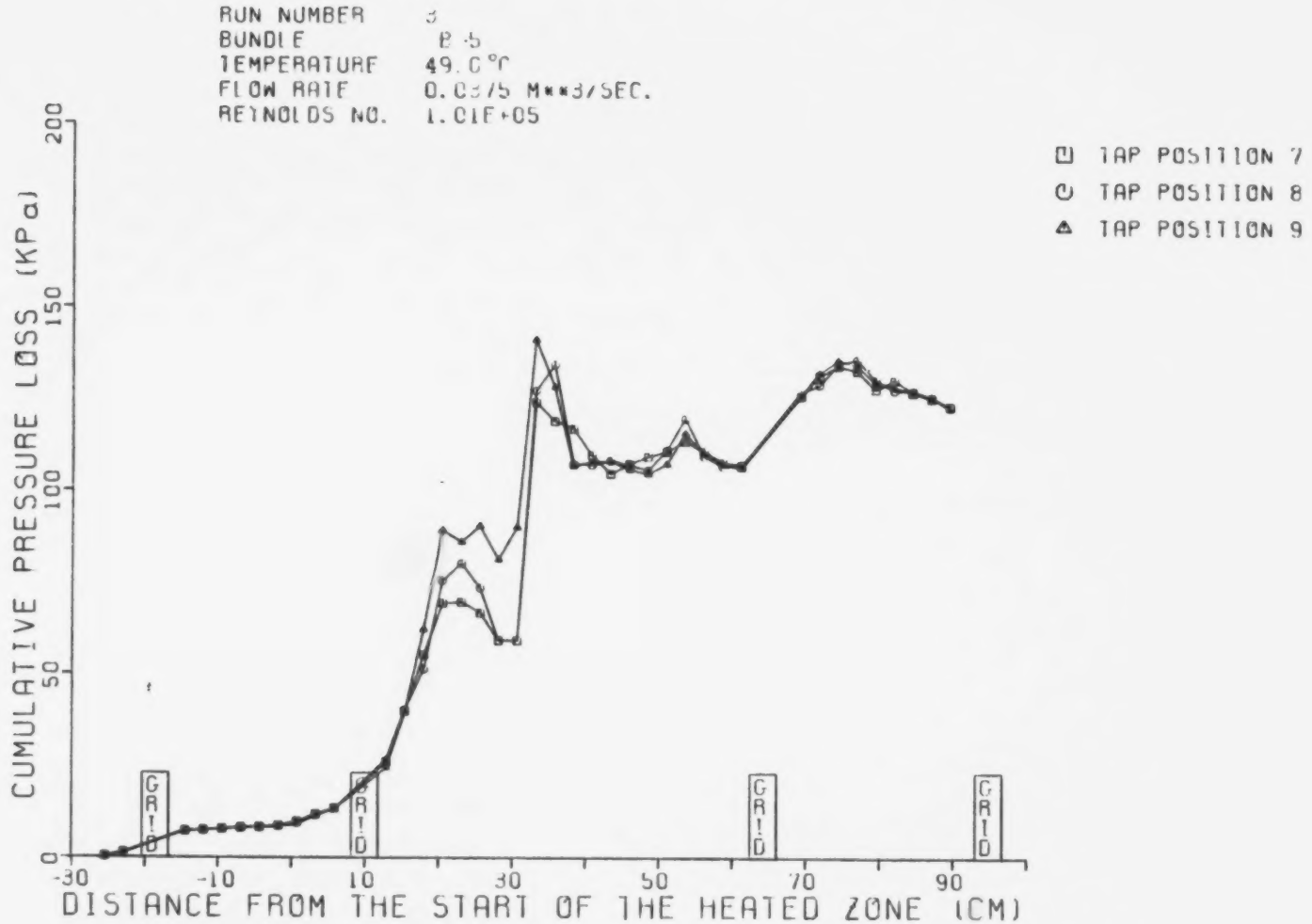
RUN NUMBER 2
BUNDLE B-5
TEMPERATURE 49.8 °C
FLOW RATE 0.0205 M**3/SEC.
REYNOLDS NO. 5.53E+04



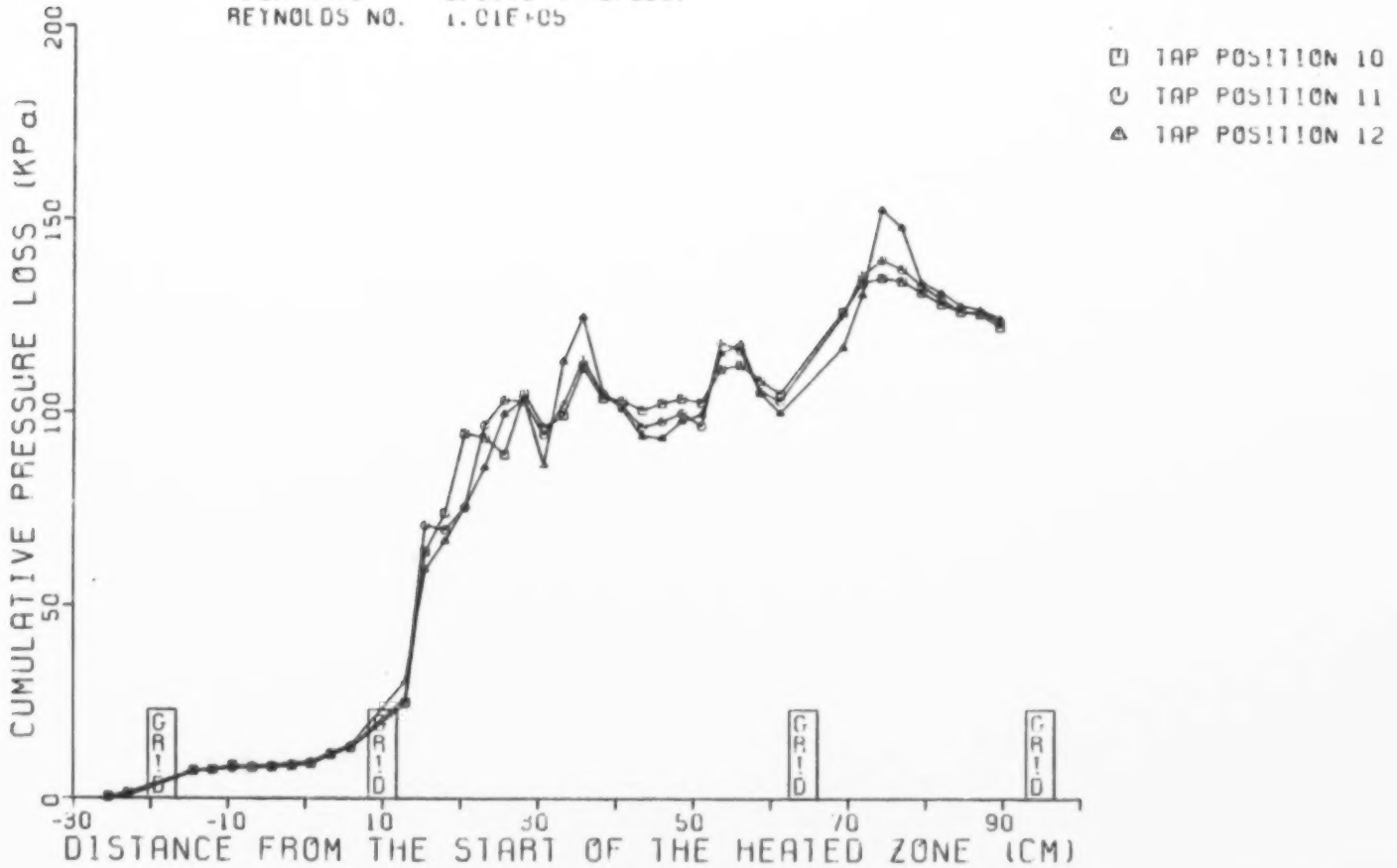

RUN NUMBER 3
BUNDLE B-5
TEMPERATURE 49.0°C
FLOW RATE 0.0375 M**3/SEC.
REYNOLDS NO. 1.01E+05
NORTH SIDE AVERAGE
SOUTH SIDE AVERAGE
EAST SIDE AVERAGE
WEST SIDE AVERAGE
CUMULATIVE PRESSURE LOSS (KPa)
0
50
100
150
200
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

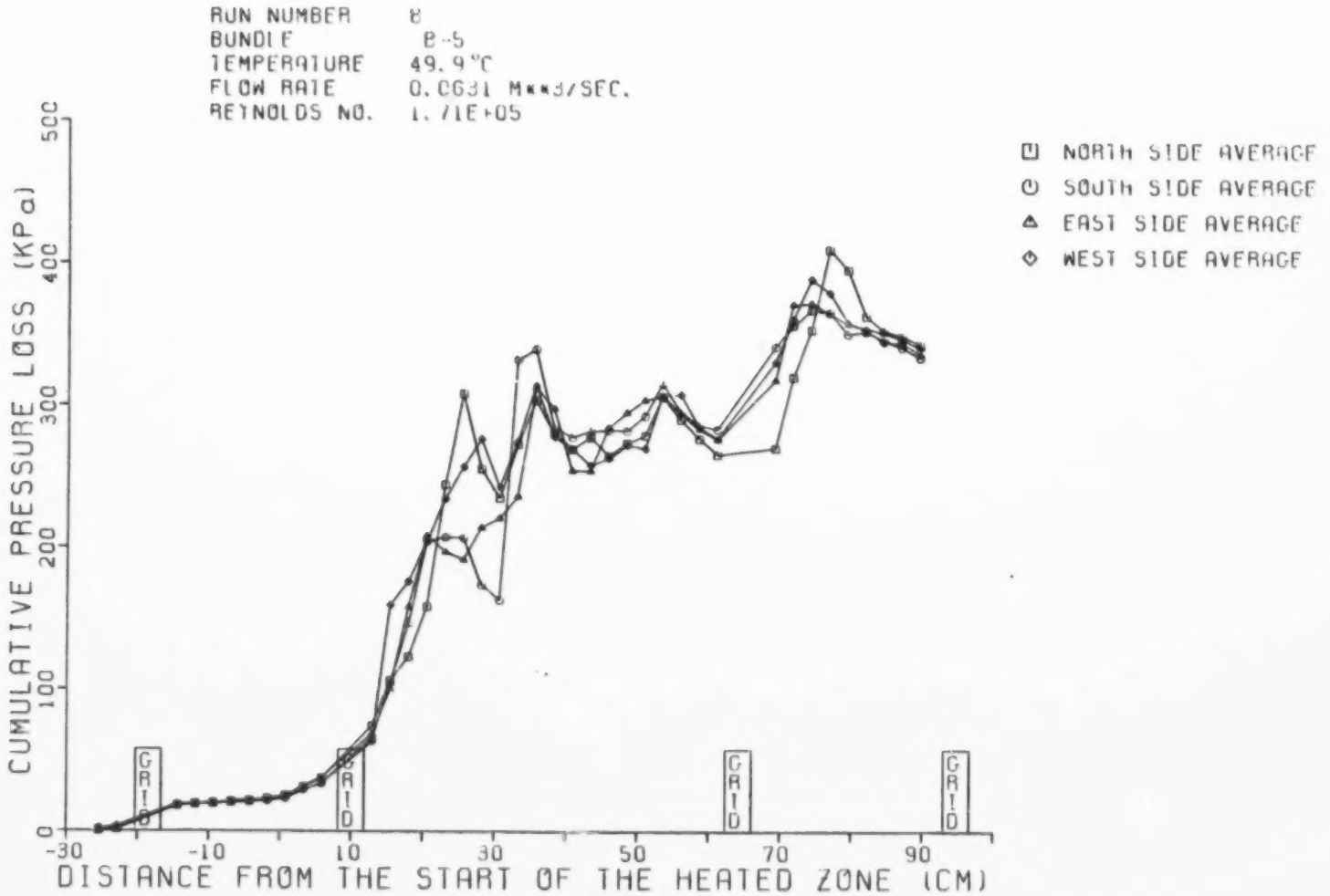
RUN NUMBER 3
BUNDLE B-5
TEMPERATURE 49.0°C
FLOW RATE 0.0375 M**3/SEC.
REYNOLDS NO. 1.01E+05
TAP POSITION 1
TAP POSITION 2
TAP POSITION 3
CUMULATIVE PRESSURE LOSS (KPa)
0
50
100
150
200
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


RUN NUMBER 3
BUNDLE B-5
TEMPERATURE 49.6°C
FLOW RATE 0.0375 M**3/SEC.
REYNOLDS NO. 1.01E+05
TAP POSITION 4
TAP POSITION 5
TAP POSITION 6
CUMULATIVE PRESSURE LOSS (KPa)
0
50
100
150
200
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

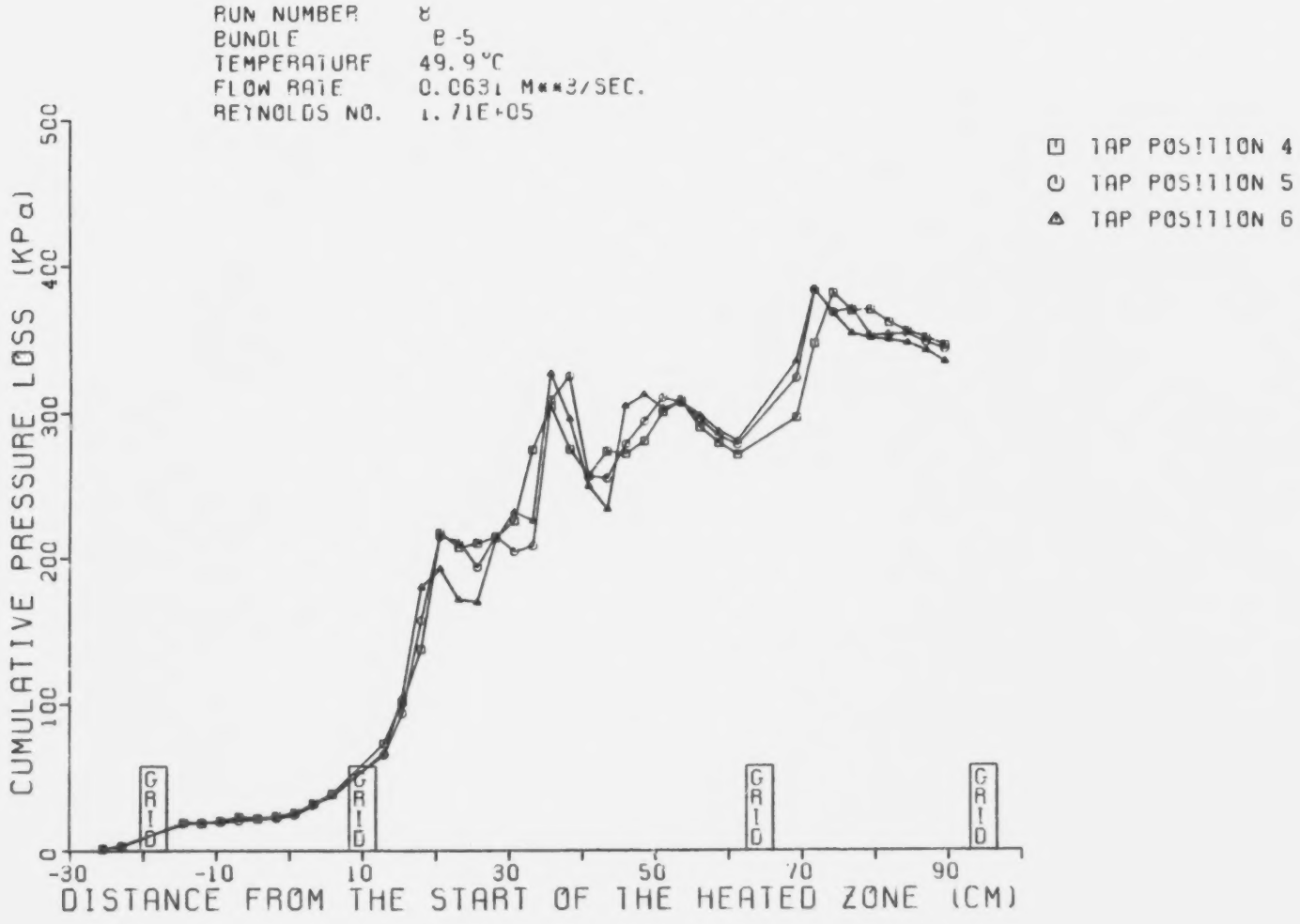

RUN NUMBER 3
BUNDLE B-5
TEMPERATURE 49.0°C
FLOW RATE 0.0375 M**3/SEC.
REYNOLDS NO. 1.01E+05
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
50
100
150
200
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

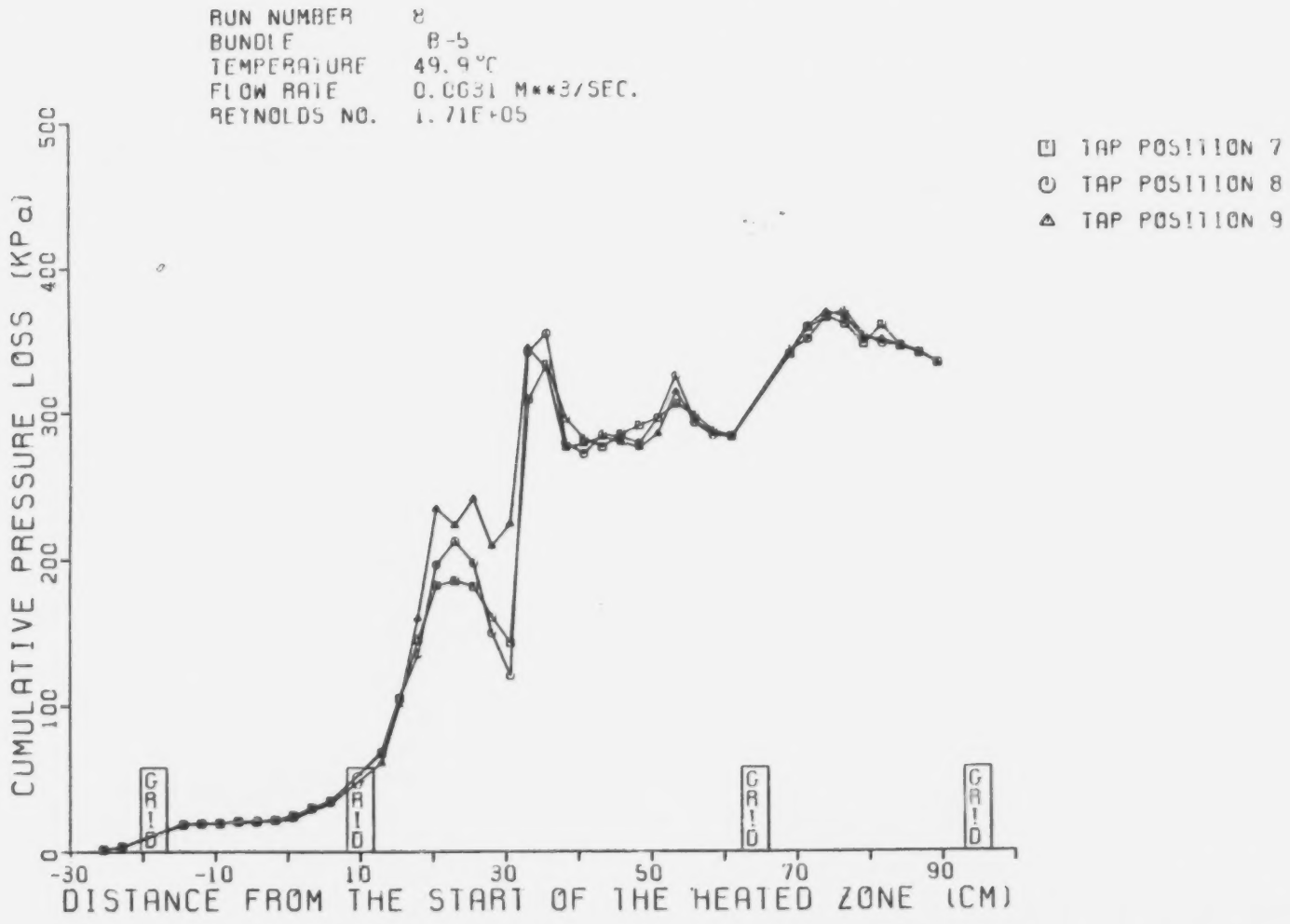
RUN NUMBER 3
BUNDLE B-5
TEMPERATURE 49.0°C
FLOW RATE 0.0375 M**3/SEC.
REYNOLDS NO. 1.01E+05

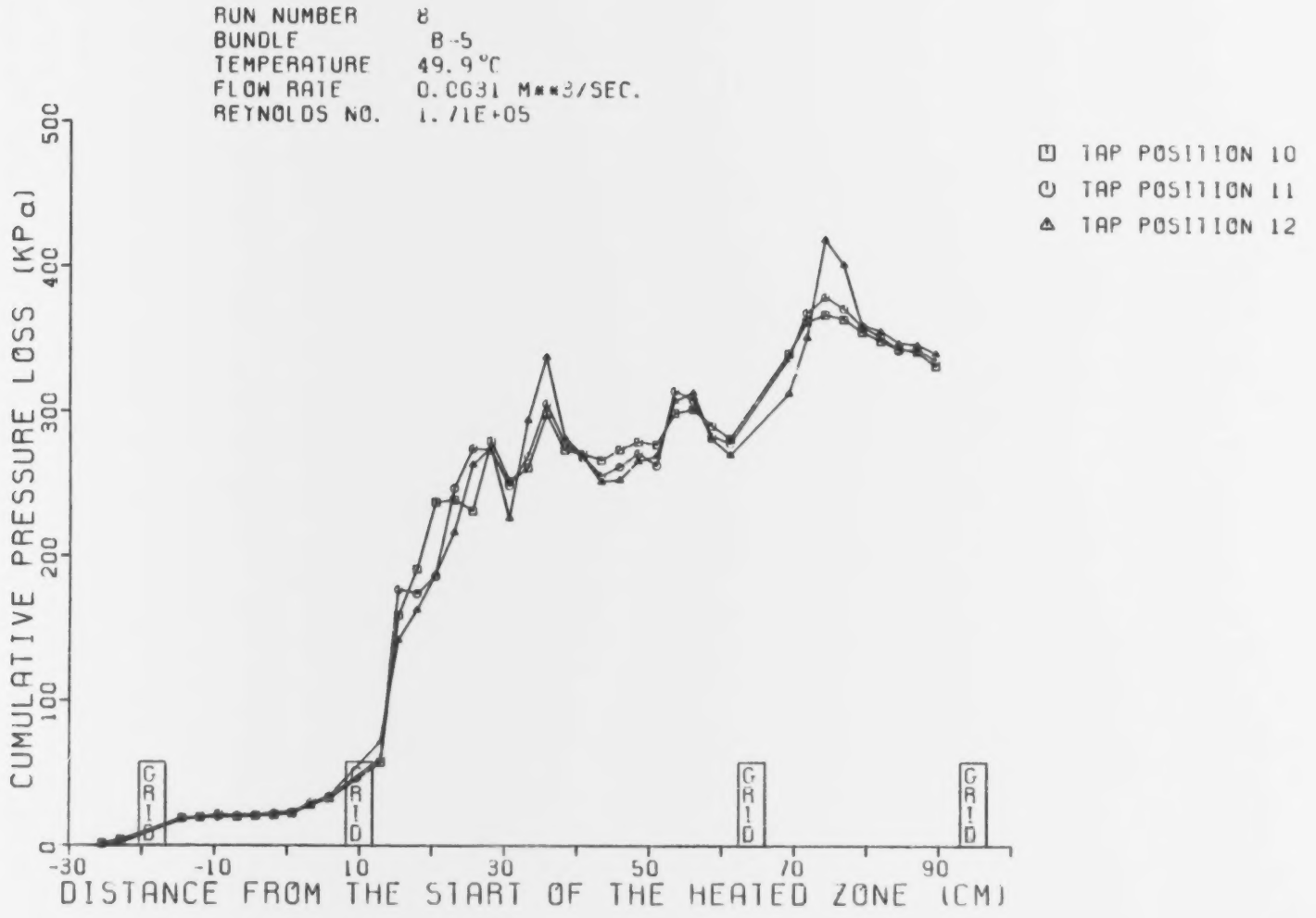



RUN NUMBER 8
BUNDLE B-5
TEMPERATURE 49.9°C
FLOW RATE 0.0631 M**3/SEC.
REYNOLDS NO. 1.71E+05
NORTH SIDE AVERAGE
SOUTH SIDE AVERAGE
EAST SIDE AVERAGE
WEST SIDE AVERAGE
CUMULATIVE PRESSURE LOSS (KPa)
0
100
200
300
400
500
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)
GRID
GRID
GRID
GRID

RUN NUMBER 8
BUNDLE B-5
TEMPERATURE 49.9°C
FLOW RATE 0.0631 M**3/SEC.
REYNOLDS NO. 1.71E+05
TAP POSITION 1
TAP POSITION 2
TAP POSITION 3
CUMULATIVE PRESSURE LOSS (KPa)
0
100
200
300
400
500
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


RUN NUMBER 8
BUNDLE B-5
TEMPERATURE 49.9°C
FLOW RATE 0.0631 M**3/SEC.
REYNOLDS NO. 1.71E+05
TAP POSITION 4
TAP POSITION 5
TAP POSITION 6
CUMULATIVE PRESSURE LOSS (KPa)
0
100
200
300
400
500
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


RUN NUMBER 8
BUNDLE B-5
TEMPERATURE 49.9°C
FLOW RATE 0.0031 M**3/SEC.
REYNOLDS NO. 1.71E+05
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
100
200
300
400
500
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

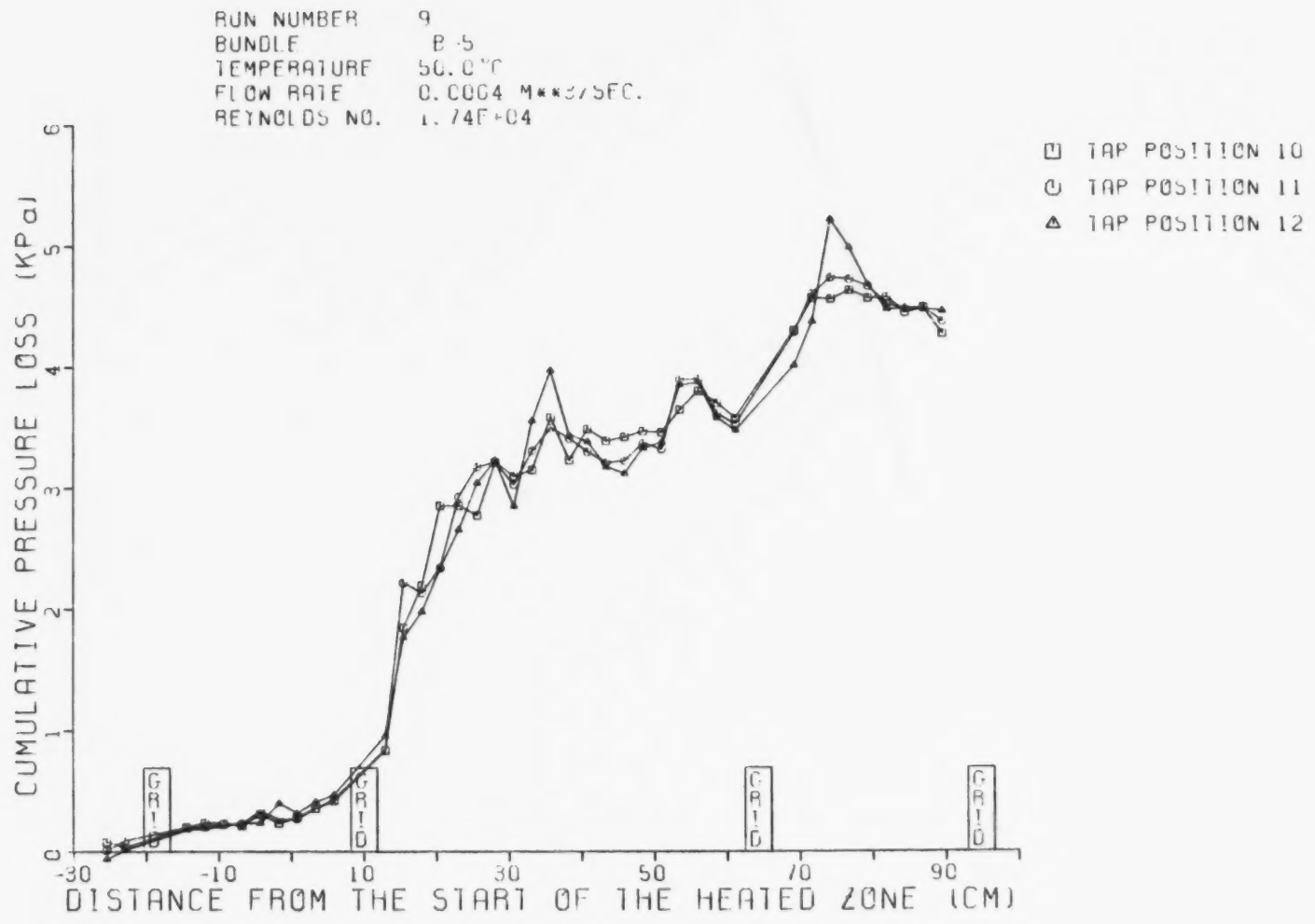

RUN NUMBER 8
BUNDLE B-5
TEMPERATURE 49.9°C
FLOW RATE 0.0631 M**3/SEC.
REYNOLDS NO. 1.71E+05
TAP POSITION 10
TAP POSITION 11
TAP POSITION 12
CUMULATIVE PRESSURE LOSS (KPa)
0
100
200
300
400
500
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

RUN NUMBER 9
BUNDLE B-5
TEMPERATURE 50.0°C
FLOW RATE 0.0004 M**3/SEC.
REYNOLDS NO. 1.74E+04
NORTH SIDE AVERAGE
SOUTH SIDE AVERAGE
EAST SIDE AVERAGE
WEST SIDE AVERAGE
CUMULATIVE PRESSURE LOSS (KPa)
0
1
2
3
4
5
6
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

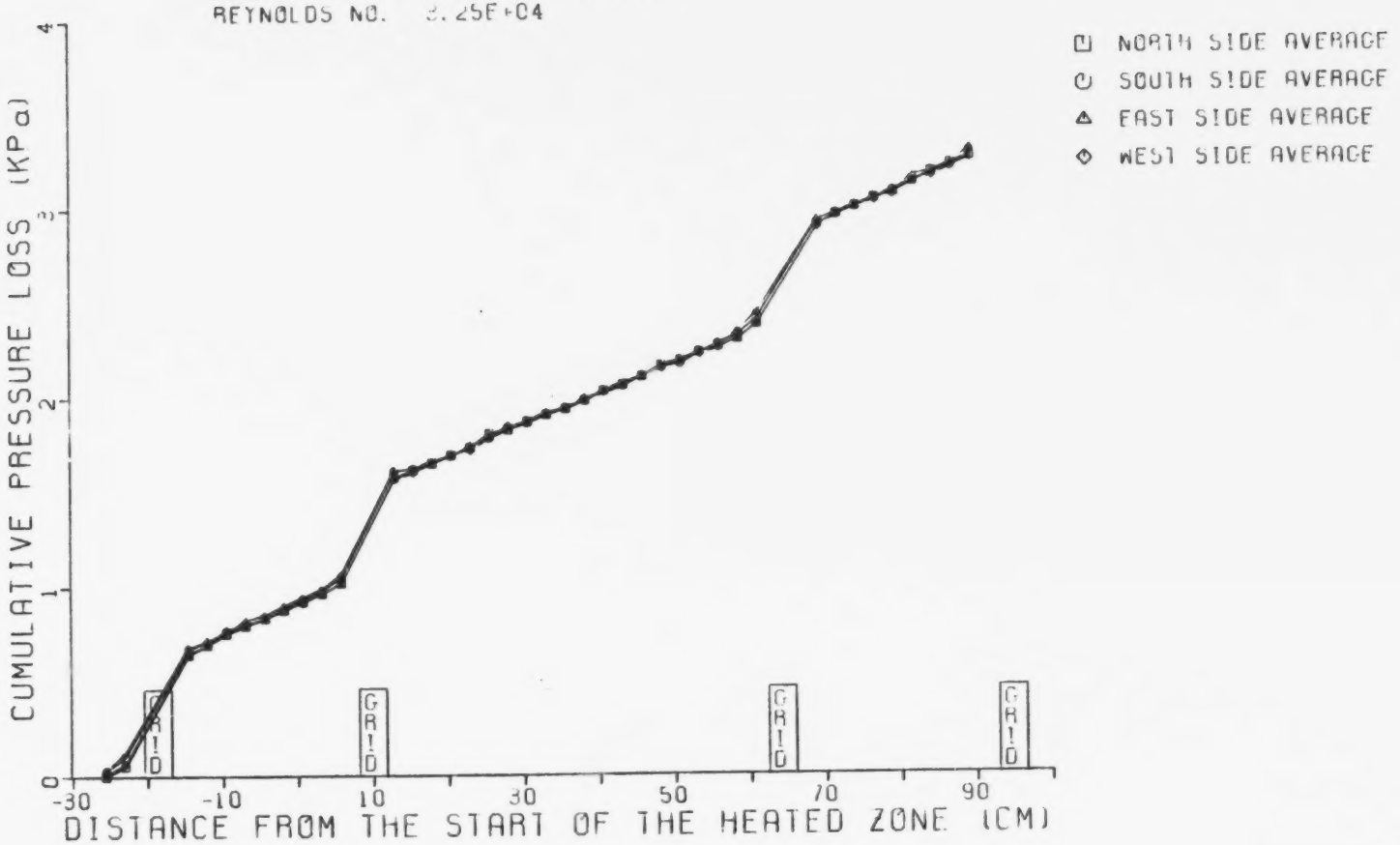
RUN NUMBER 9
BUNDLE B-5
TEMPERATURE 50.0°C
FLOW RATE 0.0064 M**3/SEC.
REYNOLDS NO. 1.74E+04

RUN NUMBER 9
BUNDLE B-5
TEMPERATURE 50.0°C
FLOW RATE 0.0064 M**3/SEC.
REYNOLDS NO. 1.74E+04

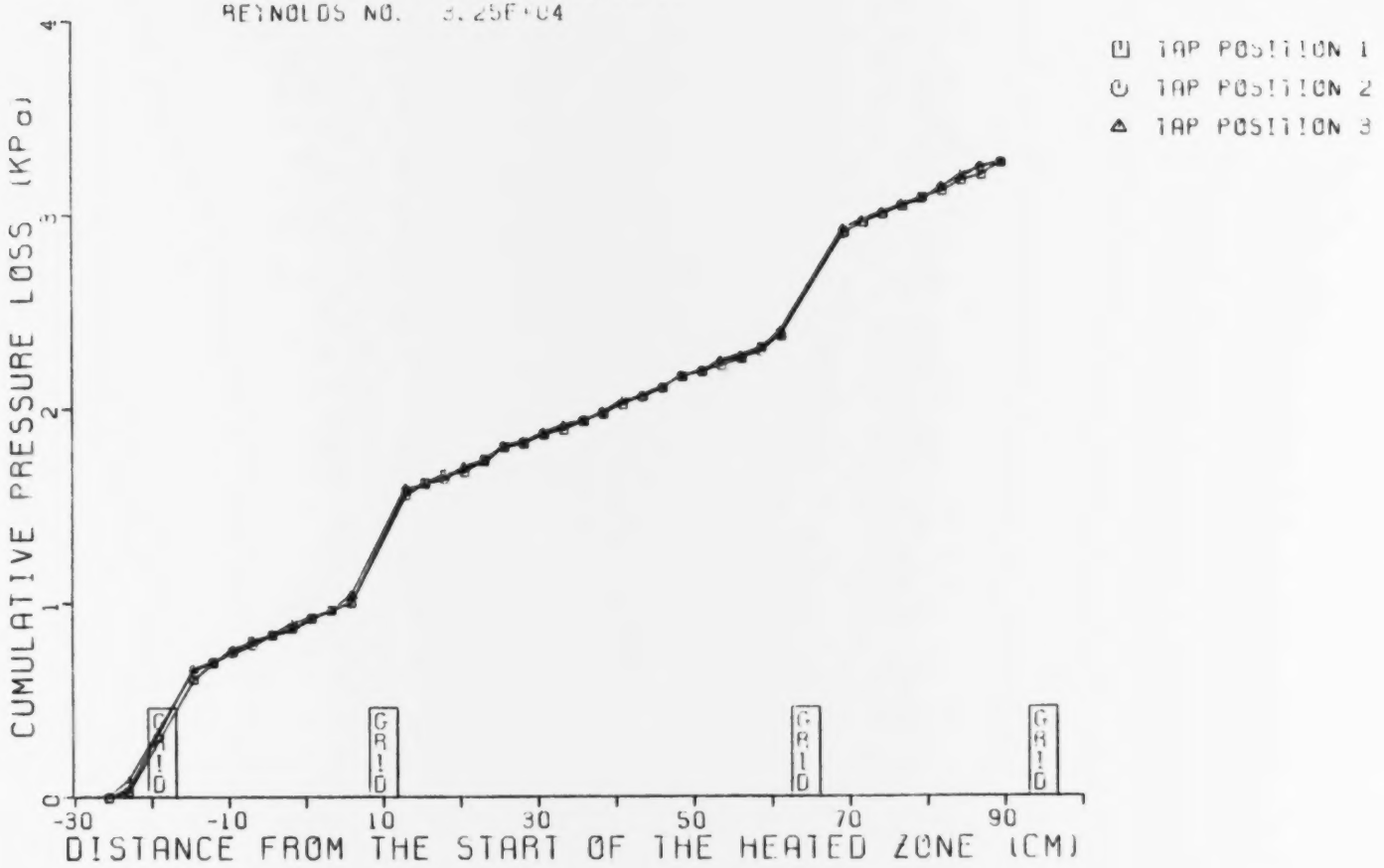
RUN NUMBER 9
BUNDLE B-5
TEMPERATURE 50.0 °C
FLOW RATE 0.0064 M**3/SEC.
REYNOLDS NO. 1.74E+04
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
1
2
3
4
5
6
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


RUN NUMBER 9
BUNDLE B-5
TEMPERATURE 50.0°C
FLOW RATE 0.0004 M**3/SEC.
REYNOLDS NO. 1.74E+04
TAP POSITION 10
TAP POSITION 11
TAP POSITION 12
CUMULATIVE PRESSURE LOSS (KPa)
0
1
2
3
4
5
6
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

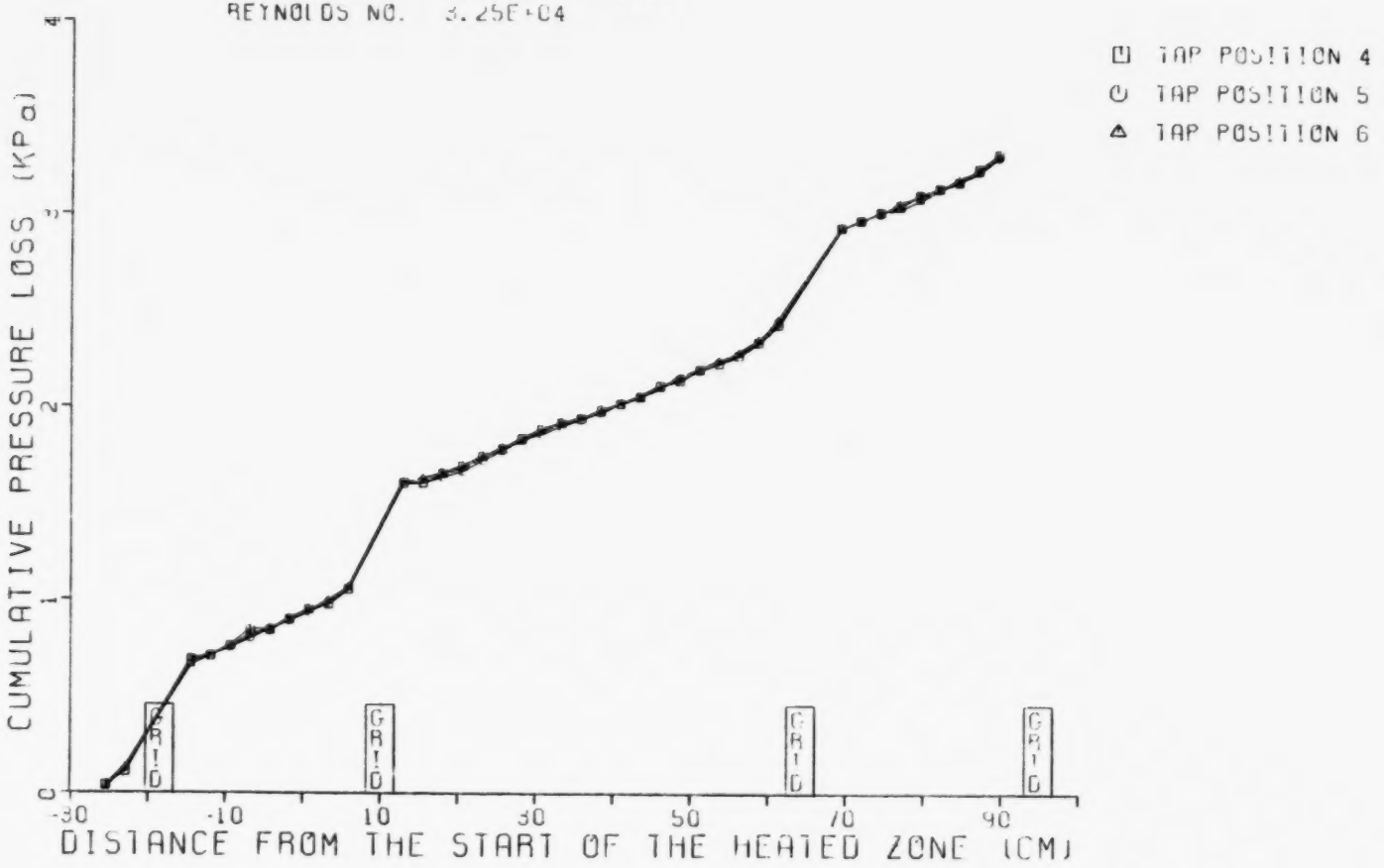
RUN NUMBER 12
BUNDLE B-5R
TEMPERATURE 50.1 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 2.25E+04

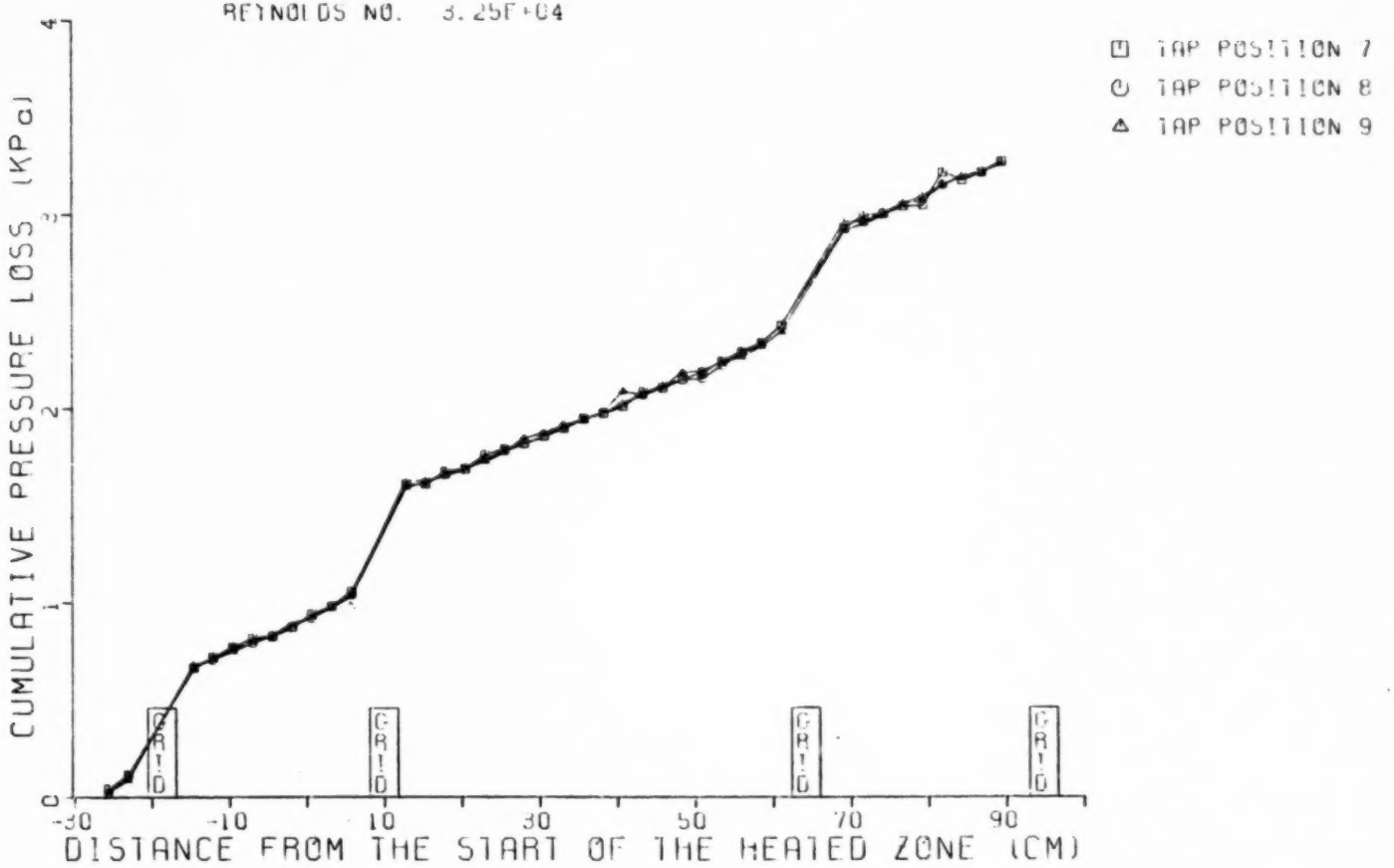


RUN NUMBER 12
BUNDLE P-5B
TEMPERATURE 50.1°C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.25E+04

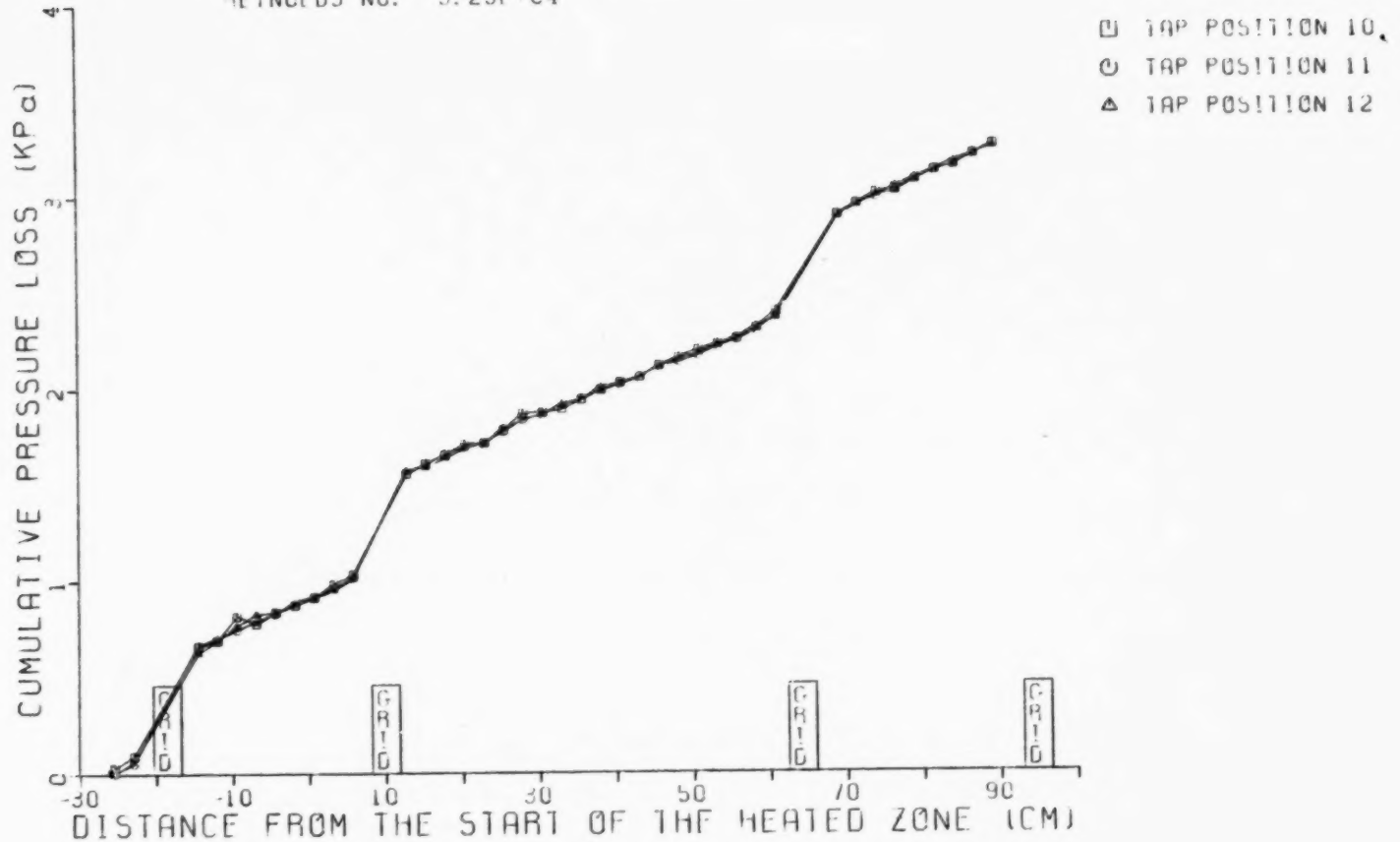


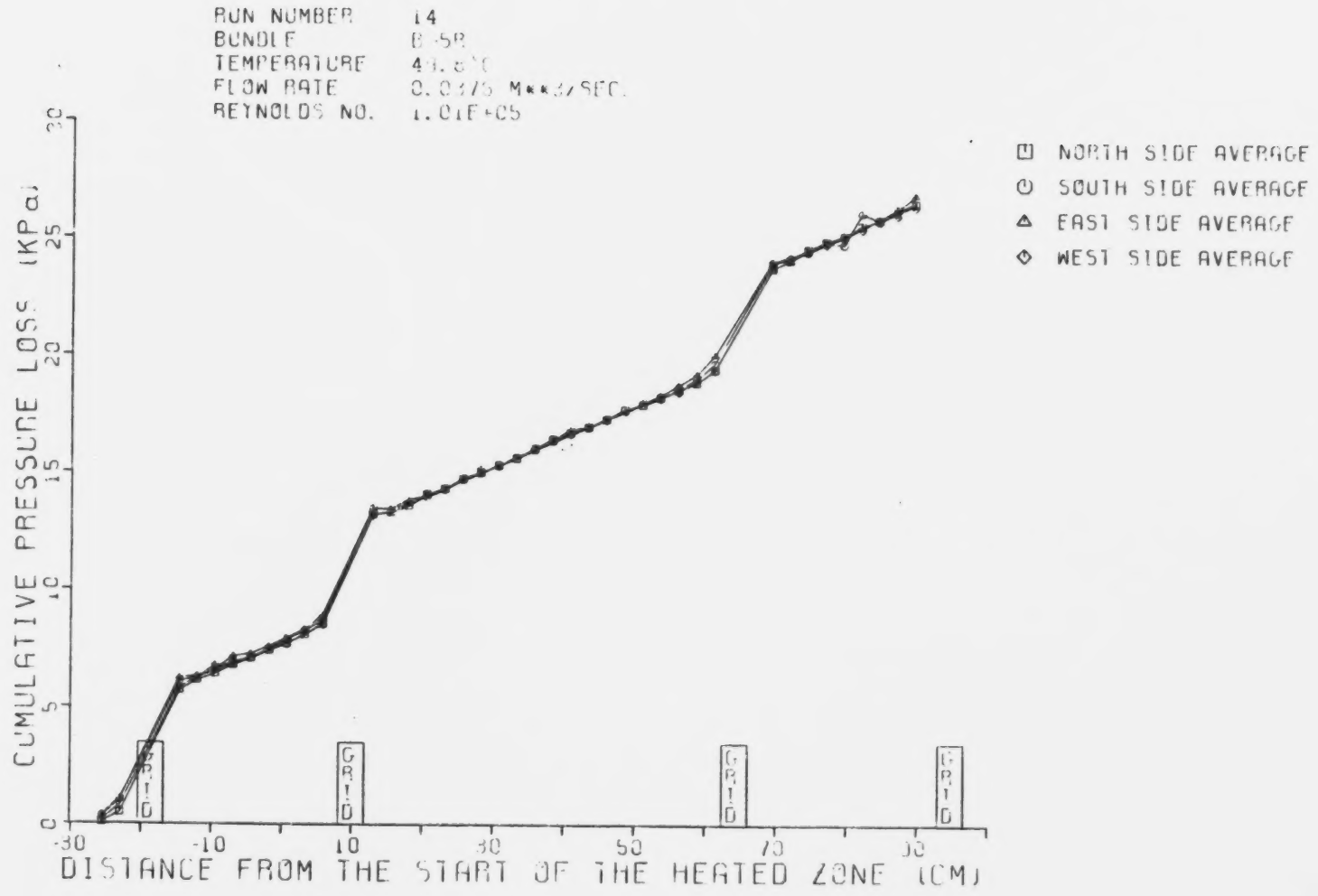
RUN NUMBER 12
SUNDLE B-5R
TEMPERATURE 50.1 °C
FLOW RATE 0.0120 M***3/SEC.
REYNOLDS NO. 3.25E+04

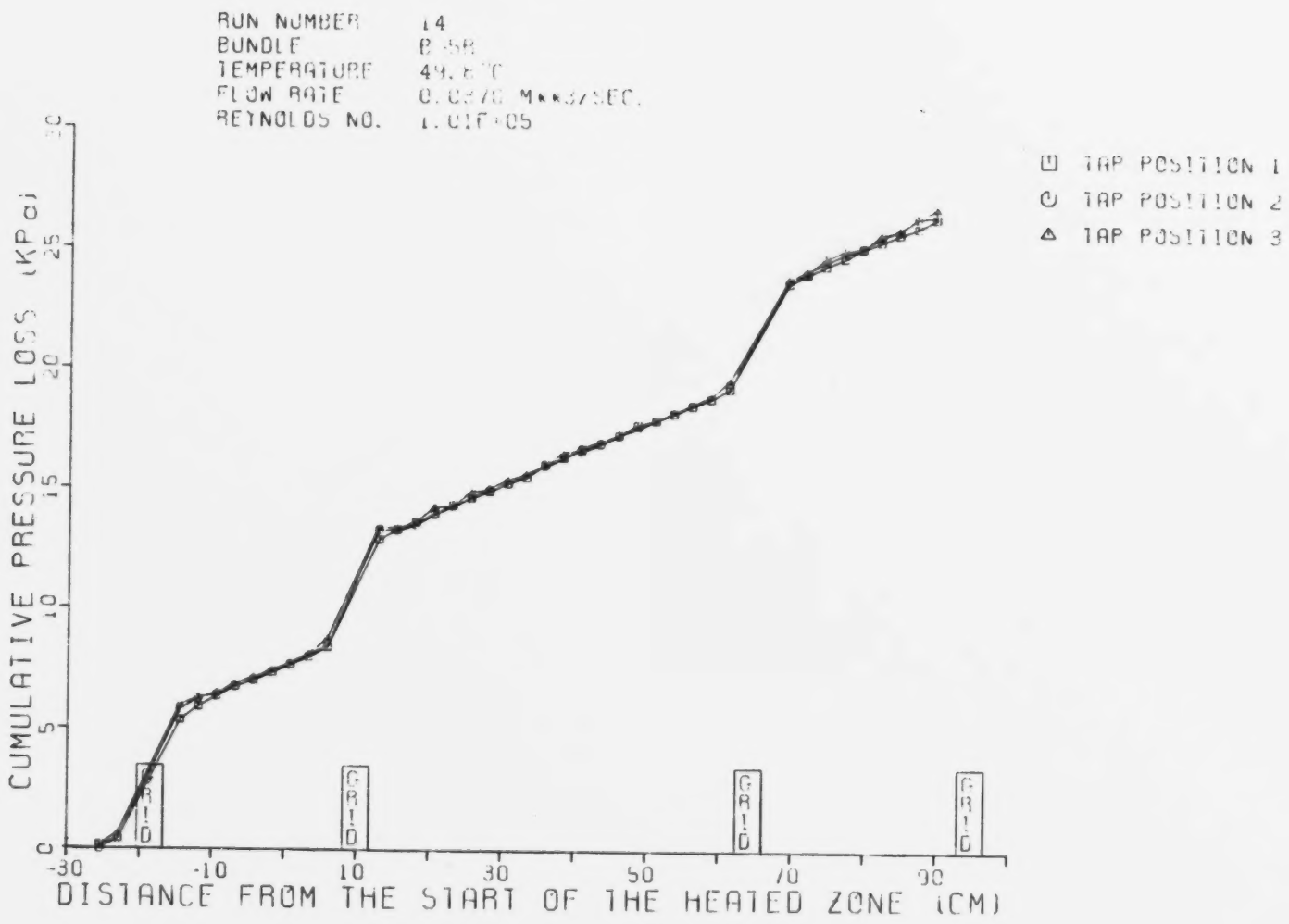


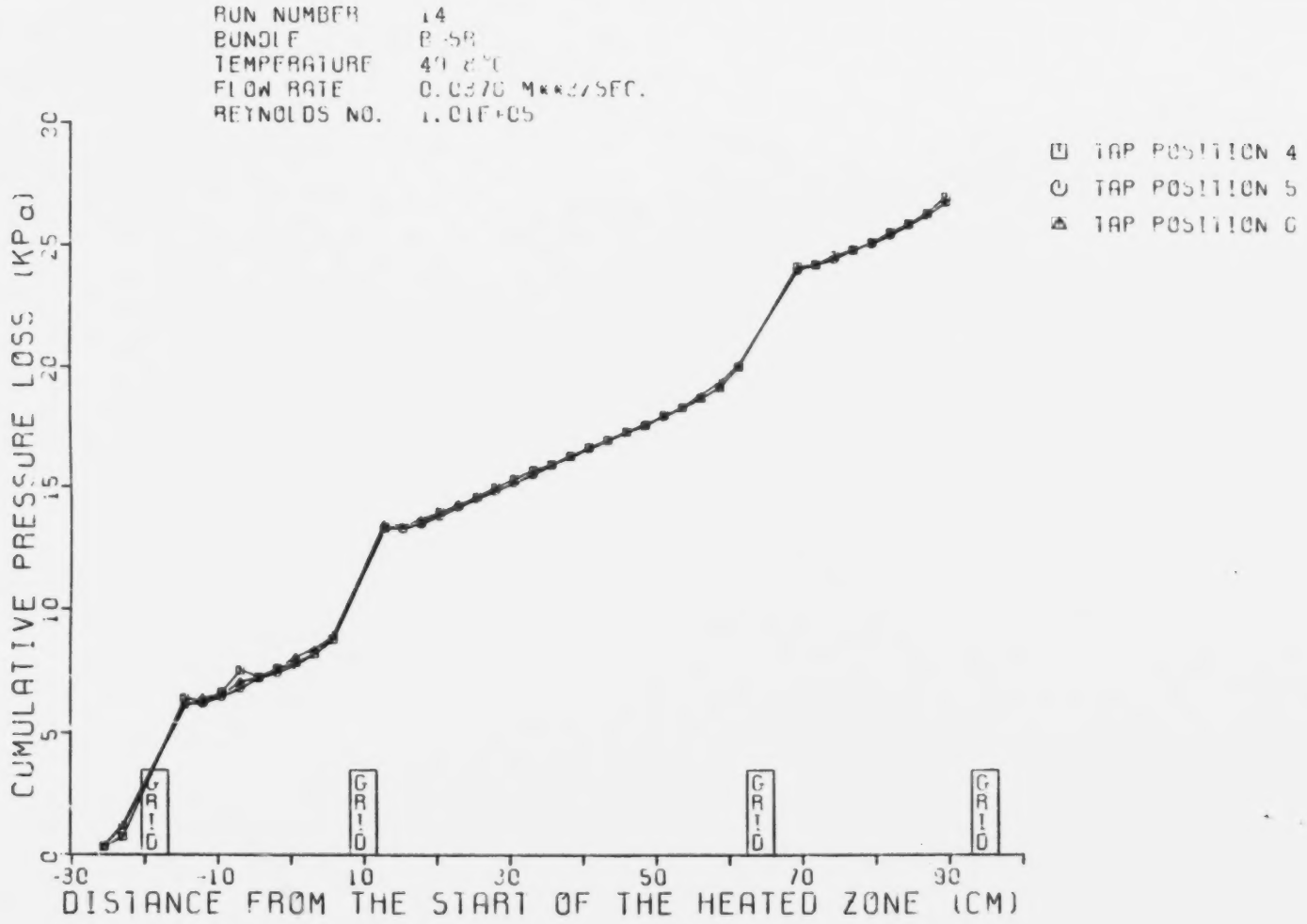

RUN NUMBER 12
BUNDLE B-5R
TEMPERATURE 50.1°C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.25E+04
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
1
2
3
4
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

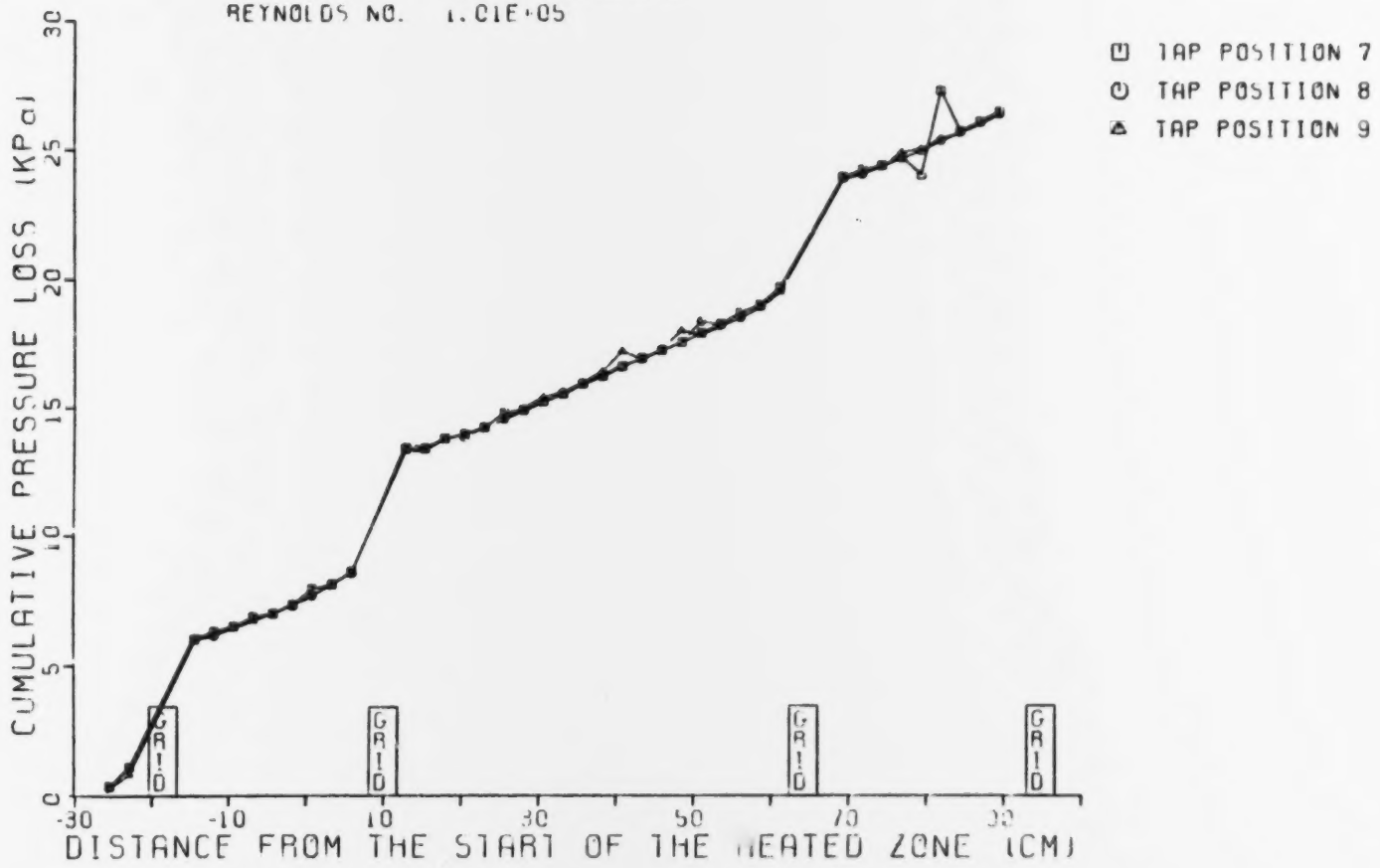
RUN NUMBER 12
BUNDLE B-5R
TEMPERATURE 50.1 °C
FLOW RATE 0.0120 M**3/SEC.
REYNOLDS NO. 3.25E+04



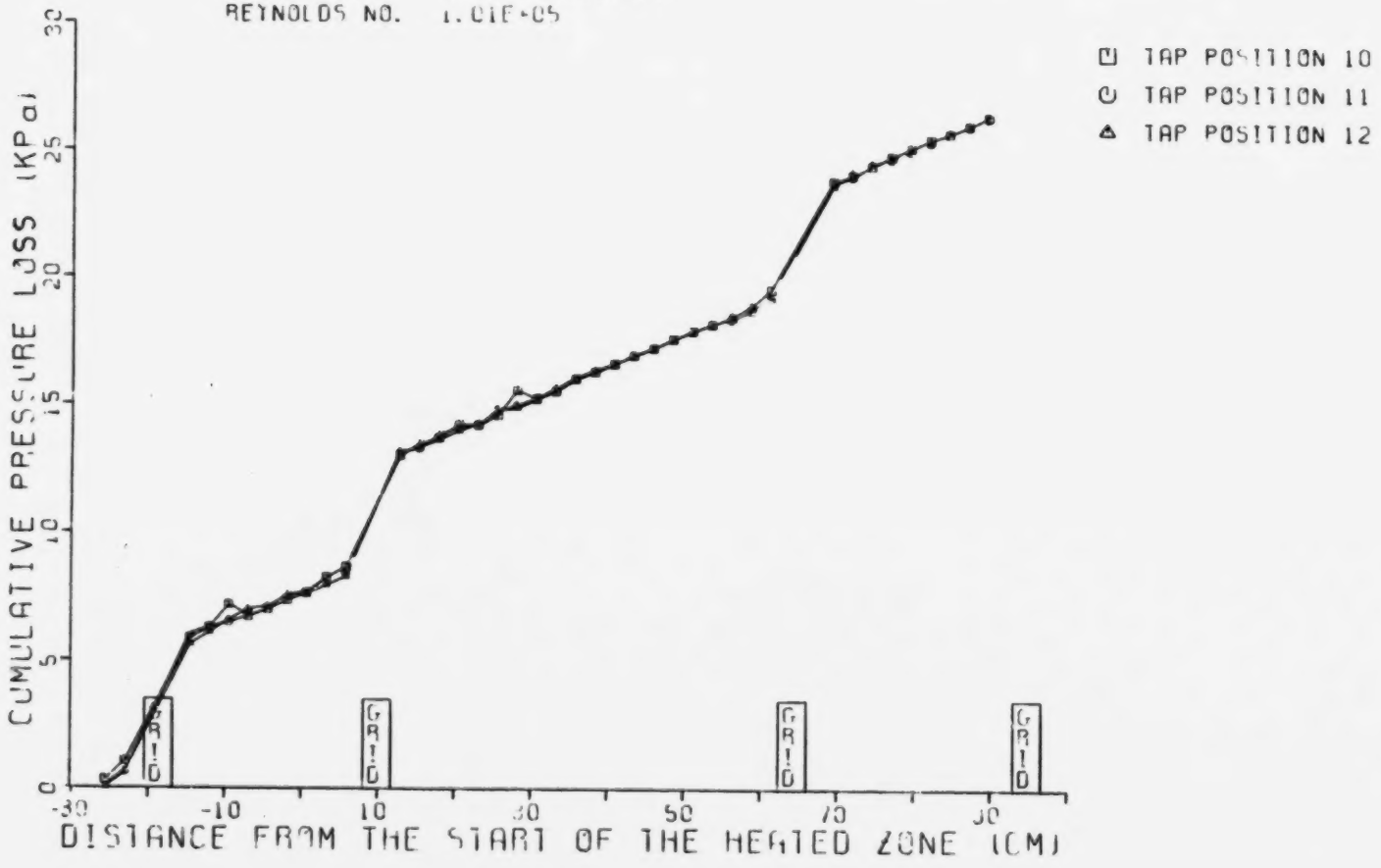

RUN NUMBER 14
BUNDLE B-5B
TEMPERATURE 49.8°C
FLOW RATE 0.0275 M**3/SEC.
REYNOLDS NO. 1.01E+05
NORTH SIDE AVERAGE
SOUTH SIDE AVERAGE
EAST SIDE AVERAGE
WEST SIDE AVERAGE
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
25
30
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)


RUN NUMBER 14
BUNDLE B-5R
TEMPERATURE 49.8°C
FLOW RATE 0.038 MASS/SEC.
REYNOLDS NO. 1.01E+05
TAP POSITION 1
TAP POSITION 2
TAP POSITION 3
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
25
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

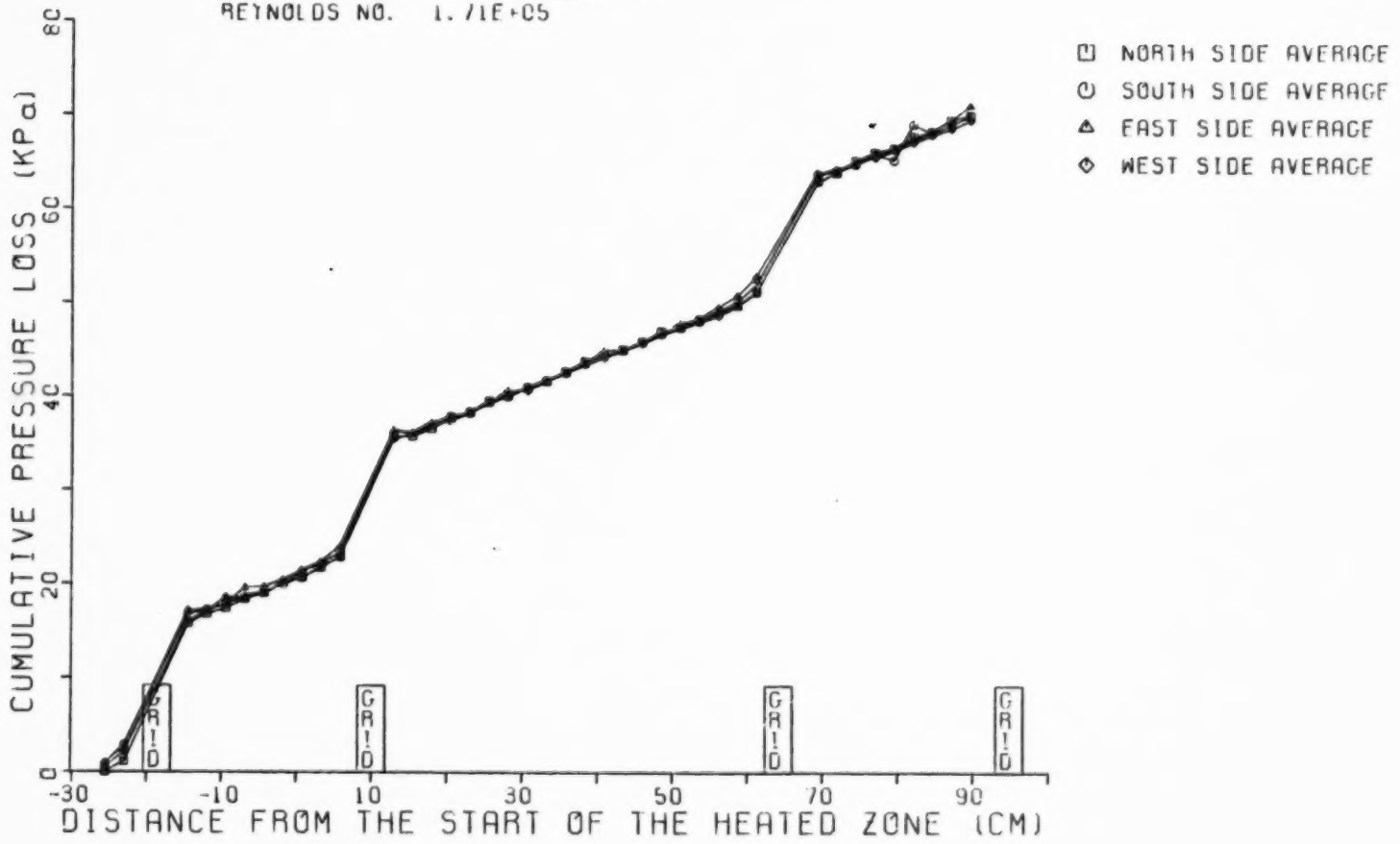

RUN NUMBER 14
BUNDLE B-5B
TEMPERATURE 40.6°C
FLOW RATE 0.0370 M**3/SEC.
REYNOLDS NO. 1.01E+05
TAP POSITION 4
TAP POSITION 5
TAP POSITION 6
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
25
30
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

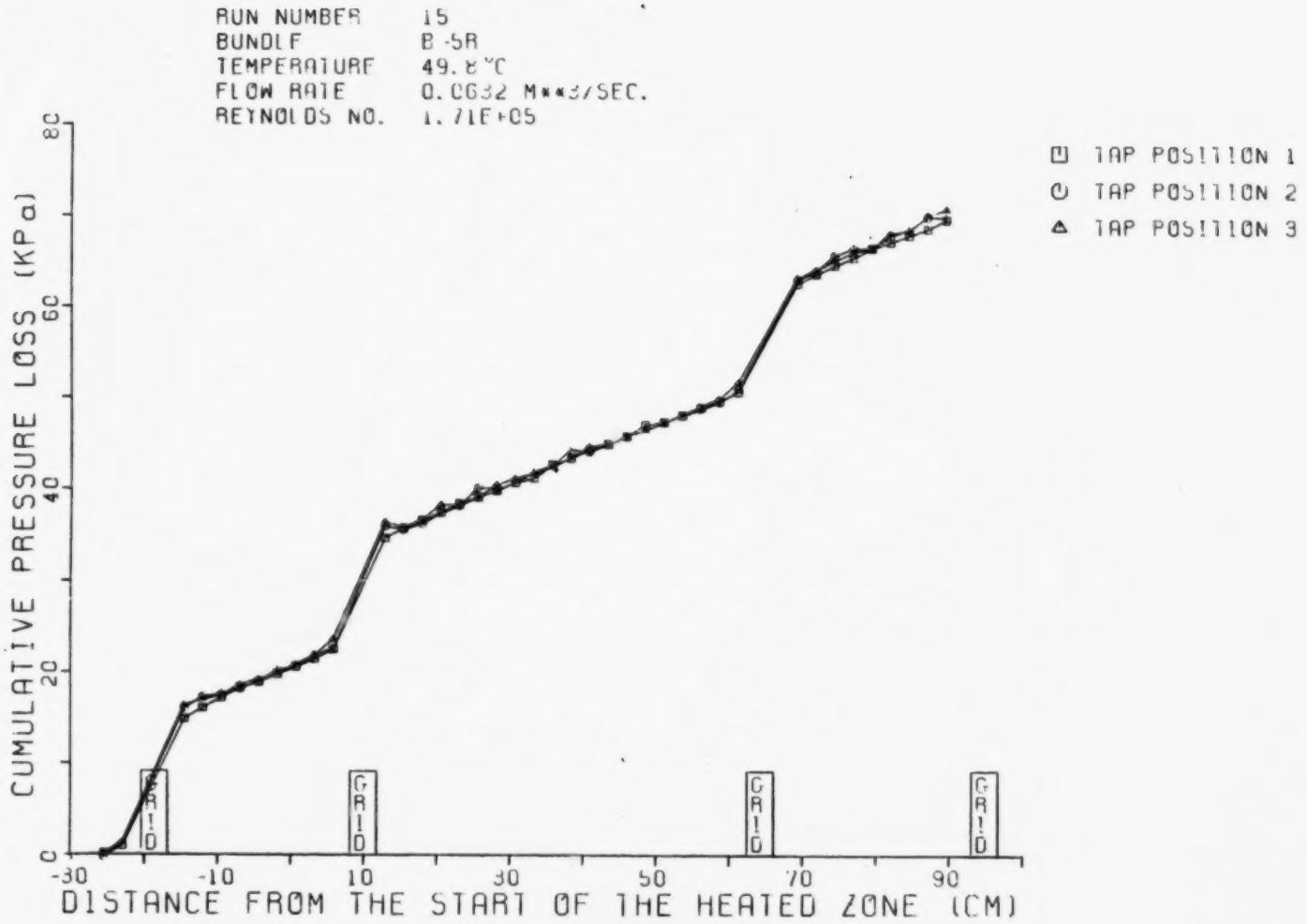

RUN NUMBER 14
BUNDLE B-5R
TEMPERATURE 49.8°C
FLOW RATE 0.C370 M**3/SEC.
REYNOLDS NO. 1.C1E+05
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
5
10
15
20
25
30
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

RUN NUMBER 14
BUNDLE B-5R
TEMPERATURE 40.8 °C
FLOW RATE 0.0375 M**3/SEC
REYNOLDS NO. 1.01E+05

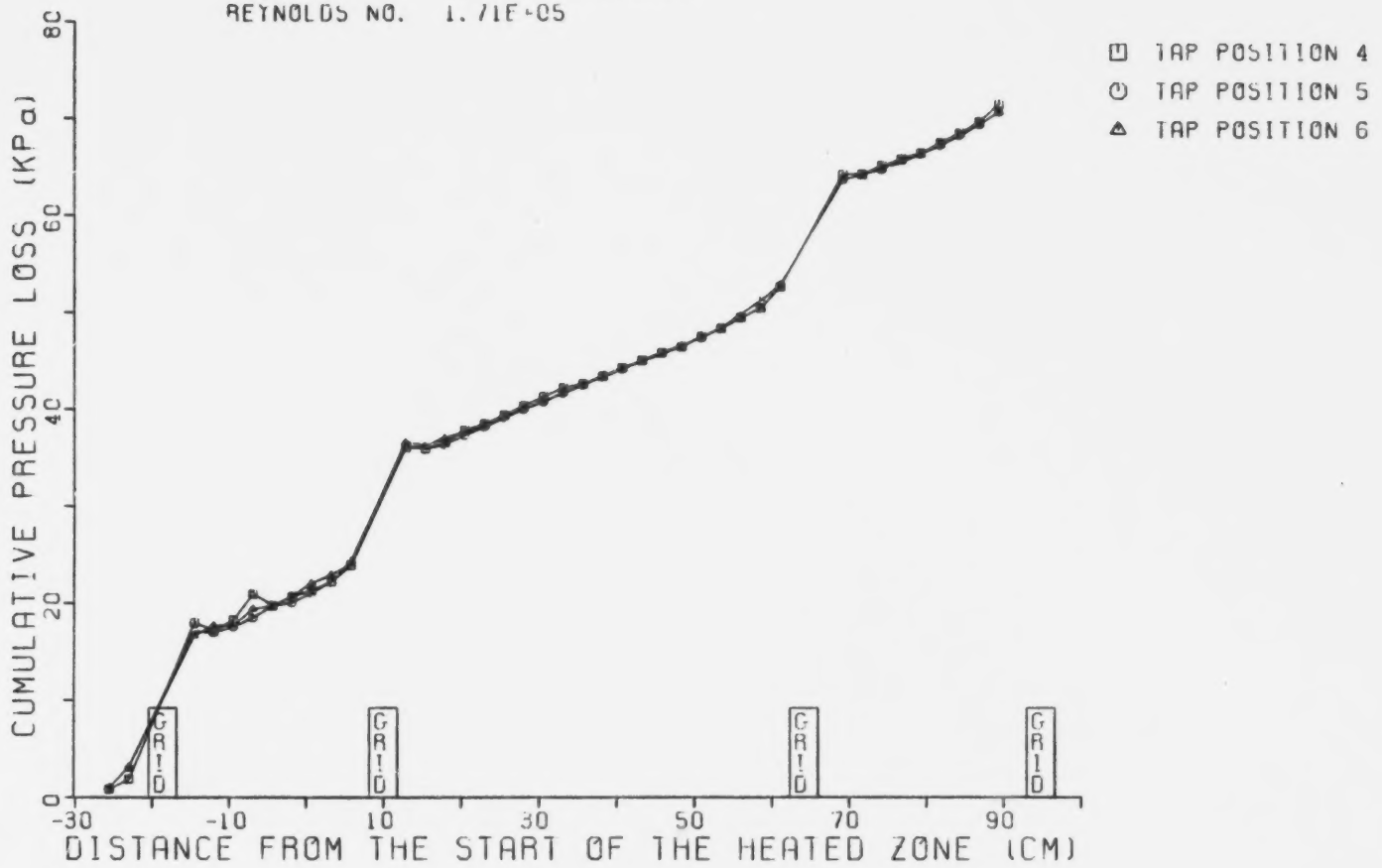


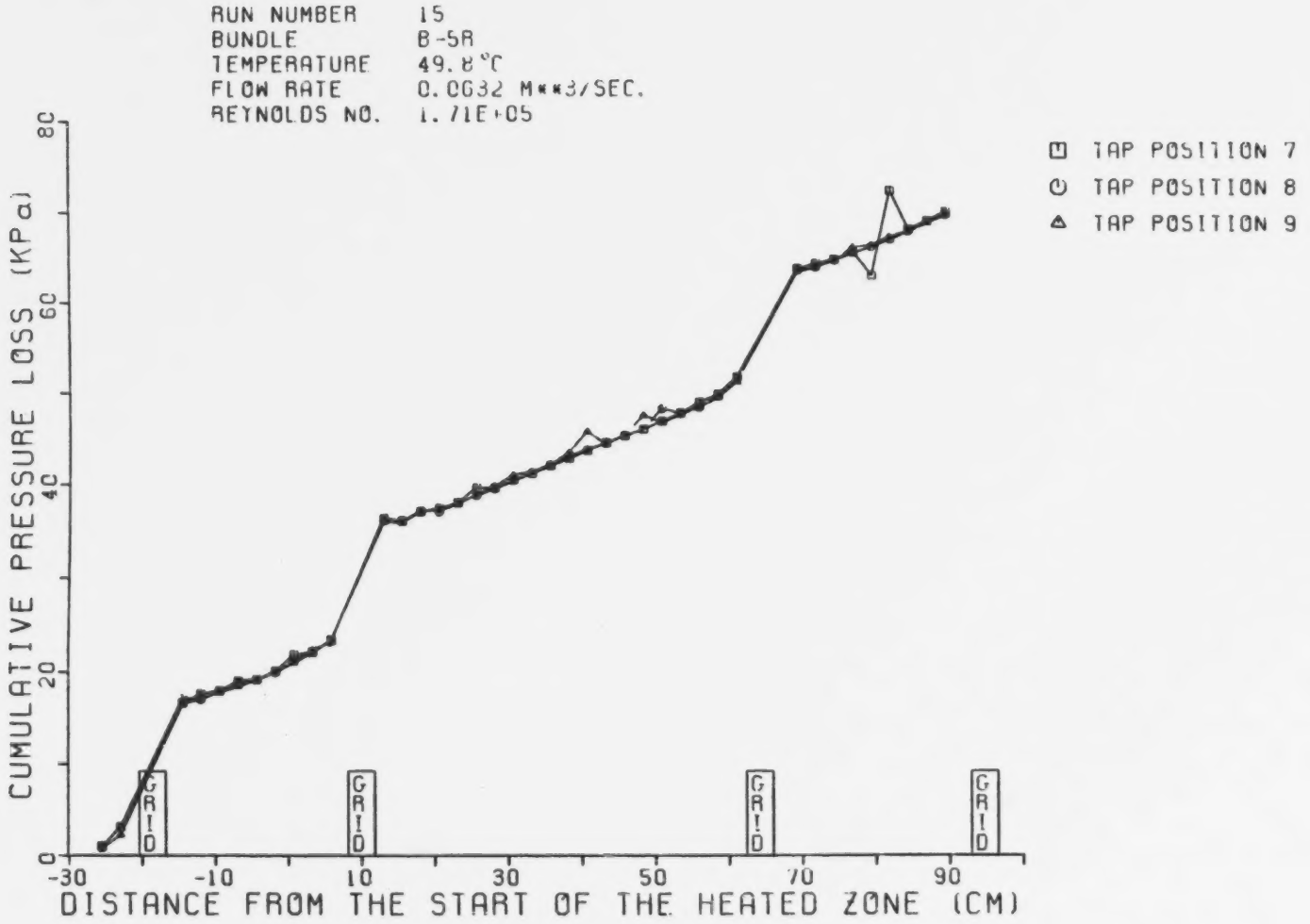
RUN NUMBER 15
BUNDLE B-5R
TEMPERATURE 49.8 °C
FLOW RATE 0.0632 M**3/SEC.
REYNOLDS NO. 1.71E+05



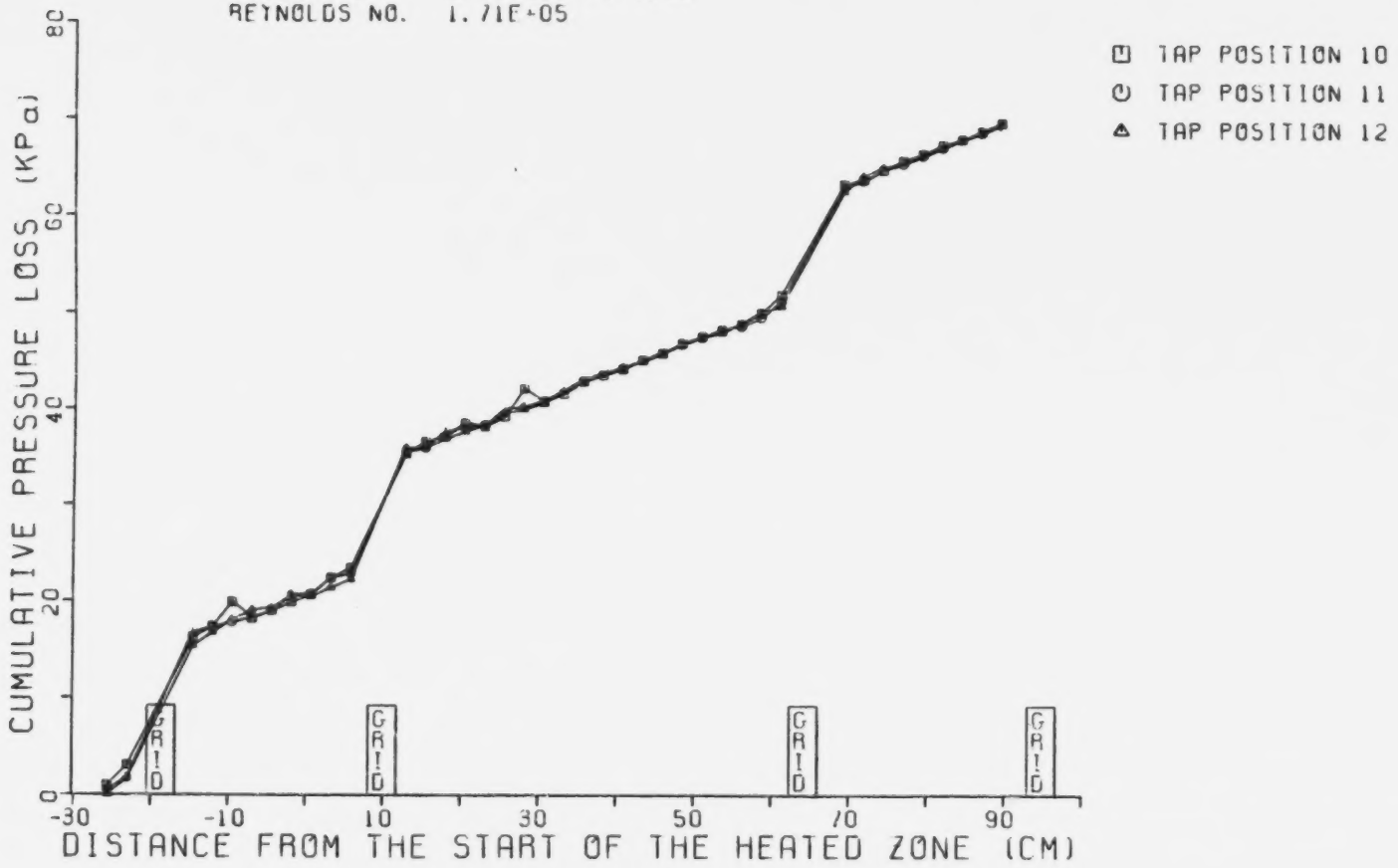

RUN NUMBER 15
BUNDLE B-5R
TEMPERATURE 49.8°C
FLOW RATE 0.0632 M**3/SEC.
REYNOLDS NO. 1.71E+05
TAP POSITION 1
TAP POSITION 2
TAP POSITION 3
CUMULATIVE PRESSURE LOSS (KPa)
0
20
40
60
80
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

RUN NUMBER 15
BUNDLE B-5R
TEMPERATURE 49.8°C
FLOW RATE 0.0032 M**3/SEC.
REYNOLDS NO. 1.71E+05

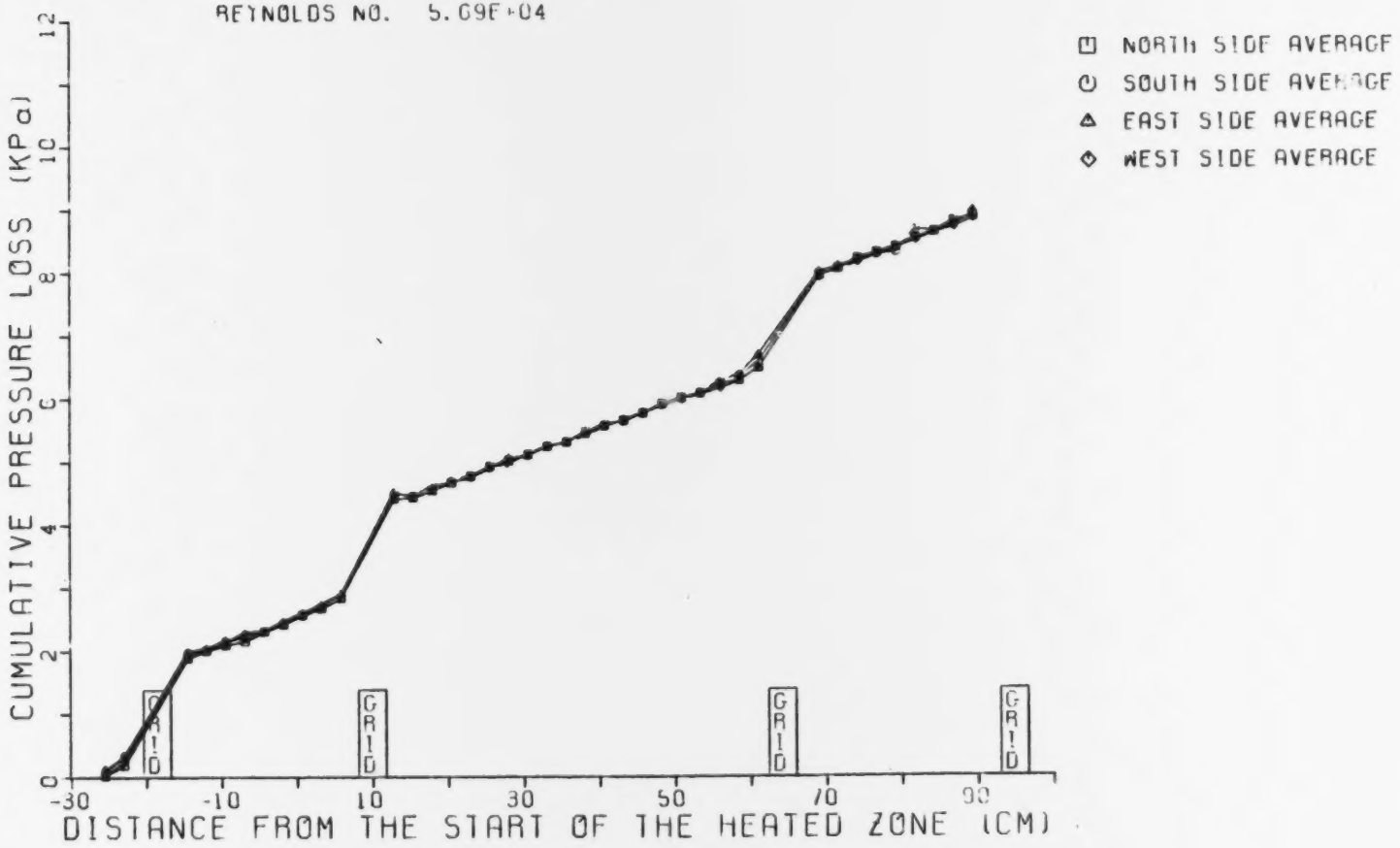



RUN NUMBER 15
BUNDLE B-5R
TEMPERATURE 49.8°C
FLOW RATE 0.0632 M**3/SEC.
REYNOLDS NO. 1.71E+05
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0
20
40
60
80
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

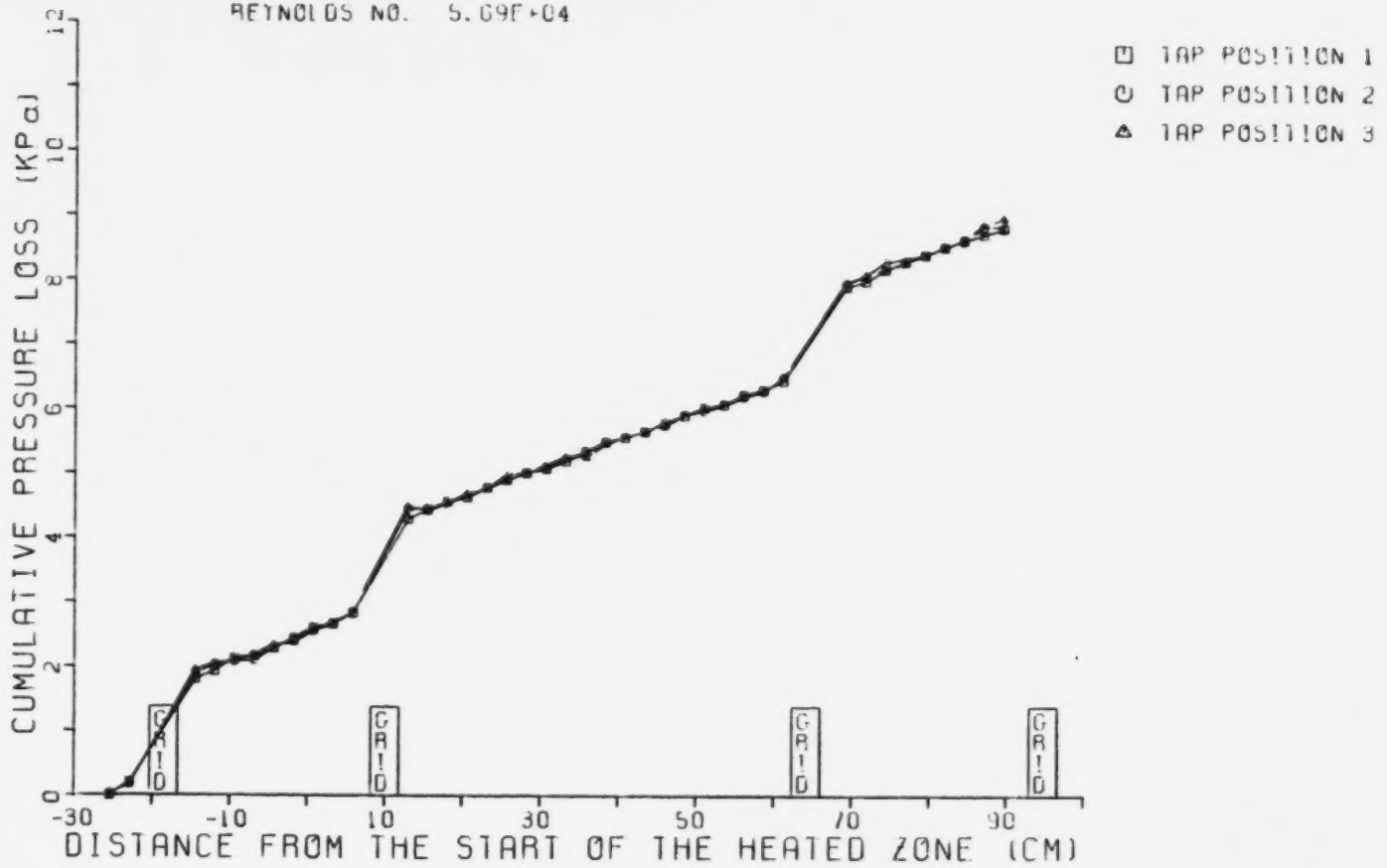
RUN NUMBER 15
BUNDLE B-5R
TEMPERATURE 49.8 °C
FLOW RATE 0.0632 M**3/SEC.
REYNOLDS NO. 1.71E+05



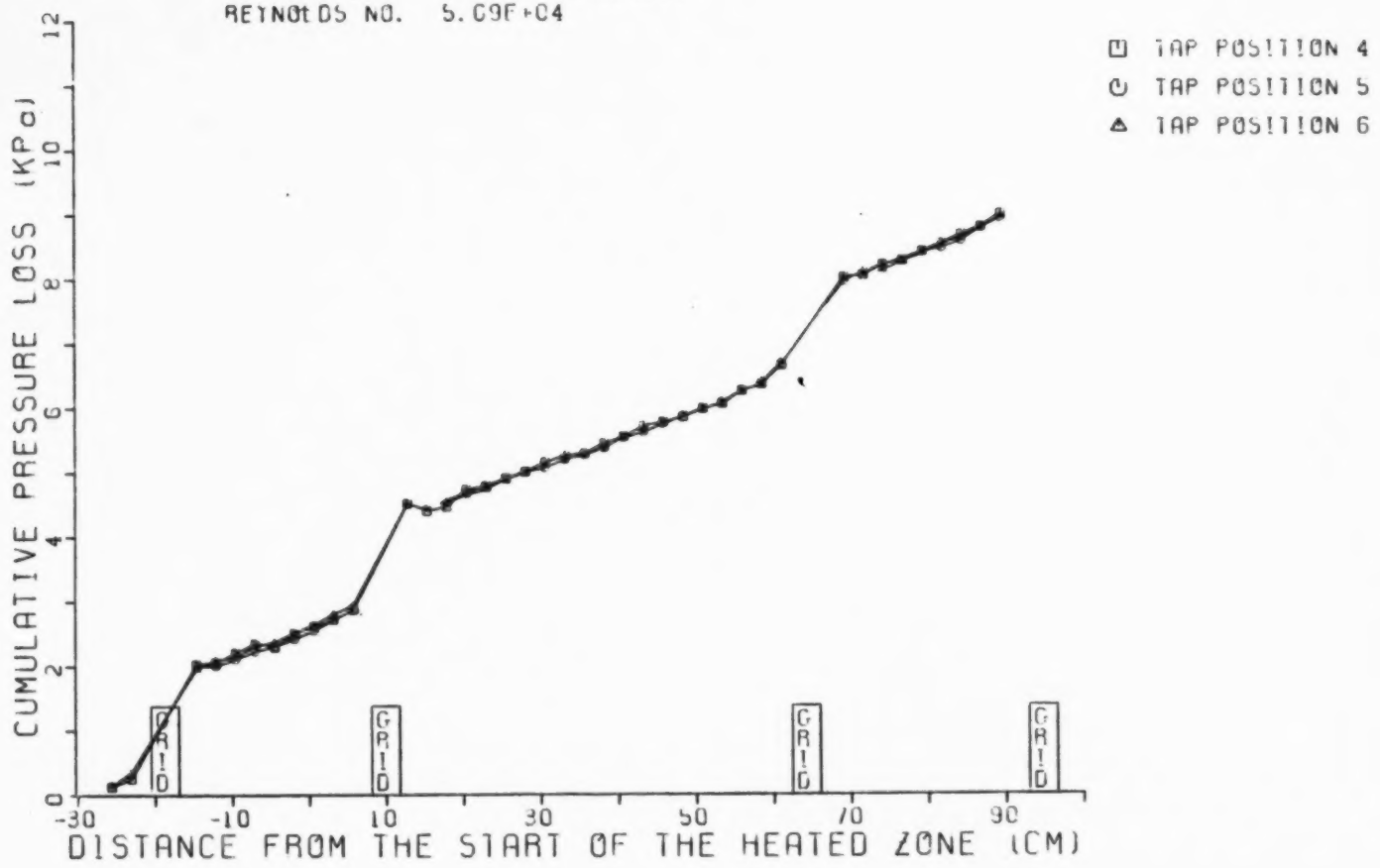
RUN NUMBER 18
BUNDLE B-5B
TEMPERATURE 51.1°C
FLOW RATE 0.0207 M**3/SEC.
REYNOLDS NO. 5.09E+04



RUN NUMBER 18
BUNDLE P-5R
TEMPERATURE 51.1°C
FLOW RATE 0.0207 M**3/SEC.
REYNOLDS NO. 5.09E+04

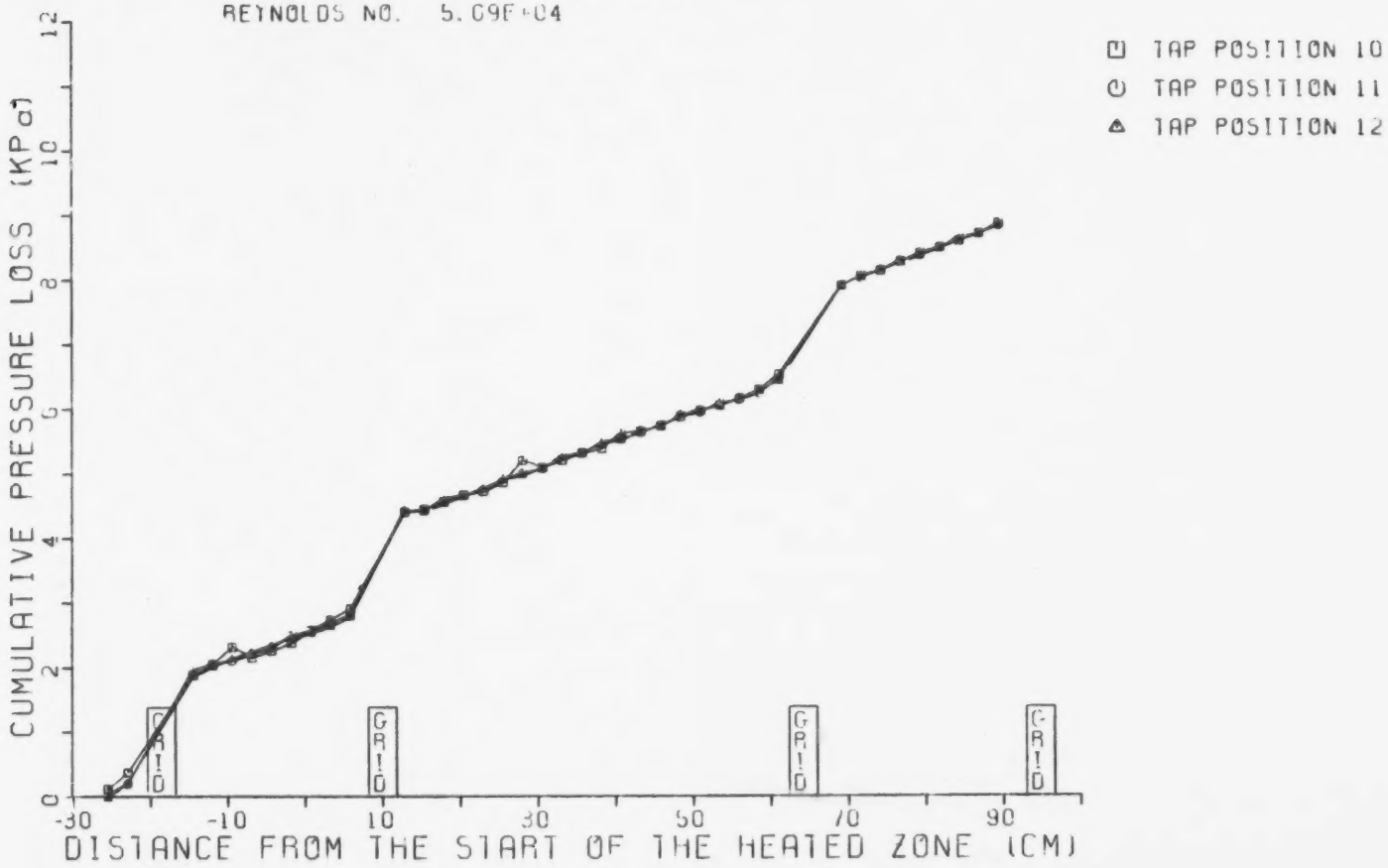


RUN NUMBER 18
BUNDLE B-5R
TEMPERATURE 51.1 °C
FLOW RATE 0.0207 M**3/SEC.
REYNOLDS NO. 5.09E+04

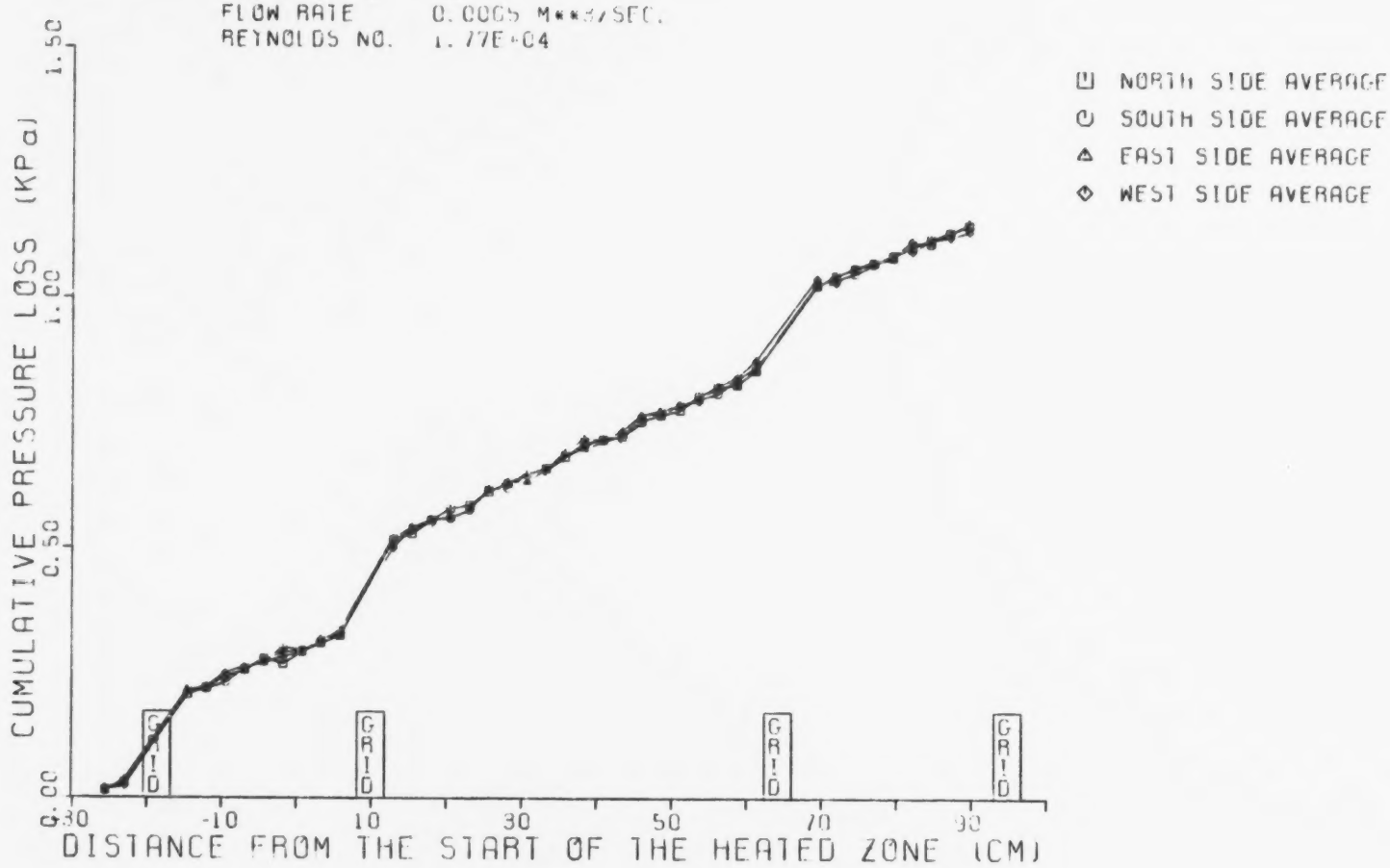


RUN NUMBER 18
BUNDLE B-5A
TEMPERATURE 51.1°C
FLOW RATE 0.0207 M**3/SEC.
REYNOLDS NO. 5.09E+04

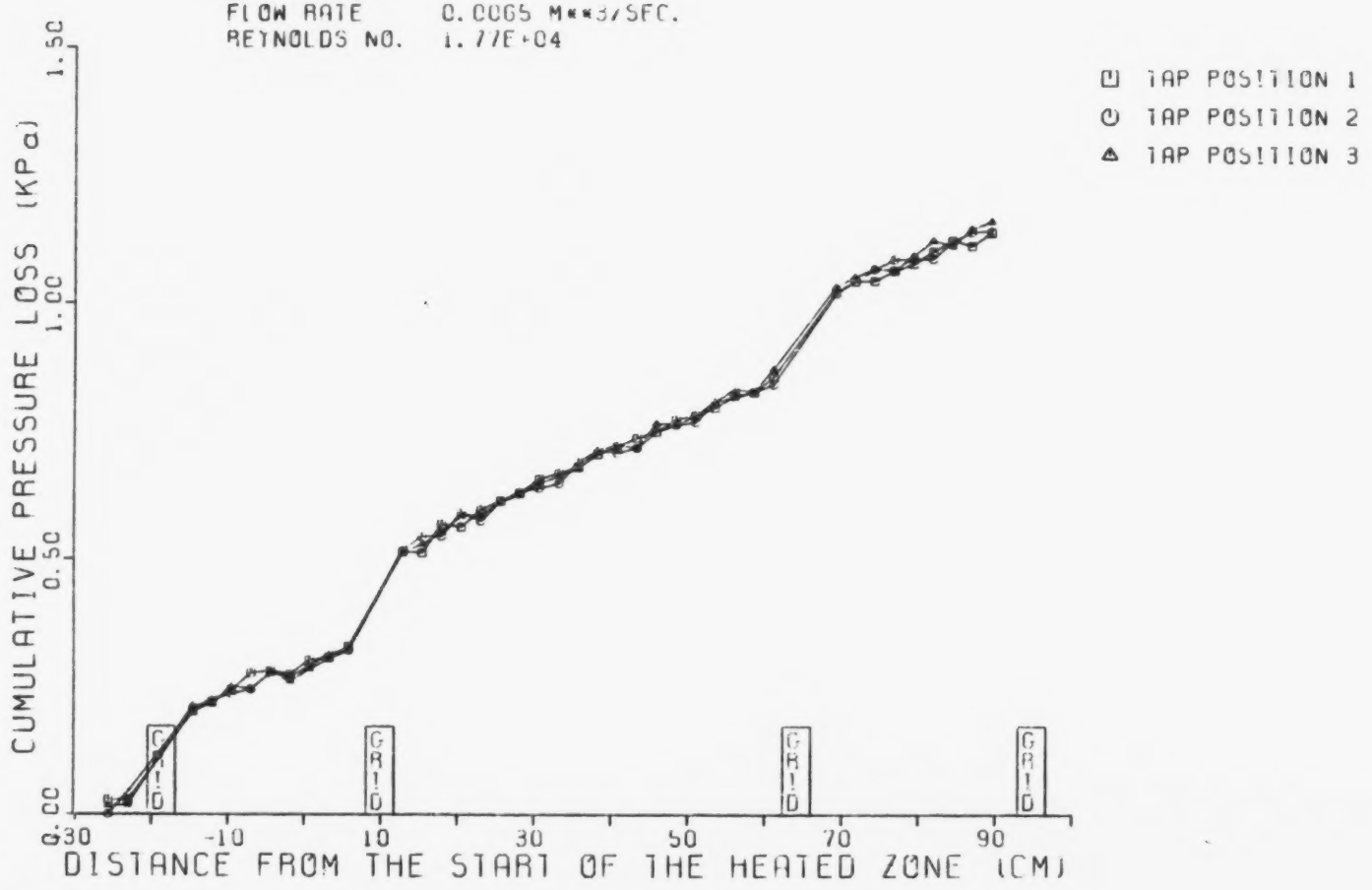
RUN NUMBER 18
BUNDLE B-5R
TEMPERATURE 51.1 °C
FLOW RATE 0.0207 M**3/SEC.
REYNOLDS NO. 5.09E+04



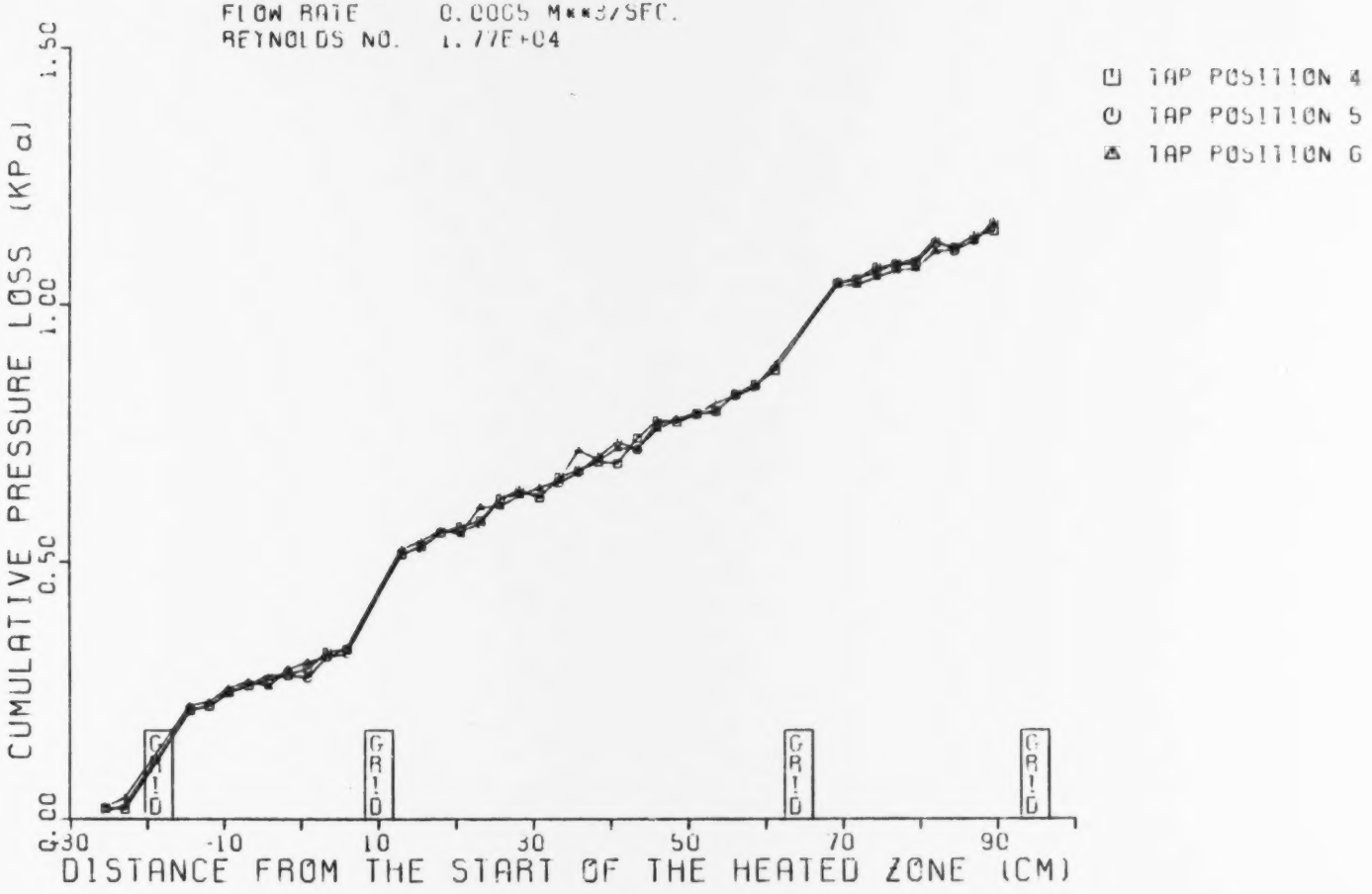
RUN NUMBER 19
BUNDLE B-5R
TEMPERATURE 50.4°C
FLOW RATE 0.0005 M**3/SEC.
REYNOLDS NO. 1.77E+04

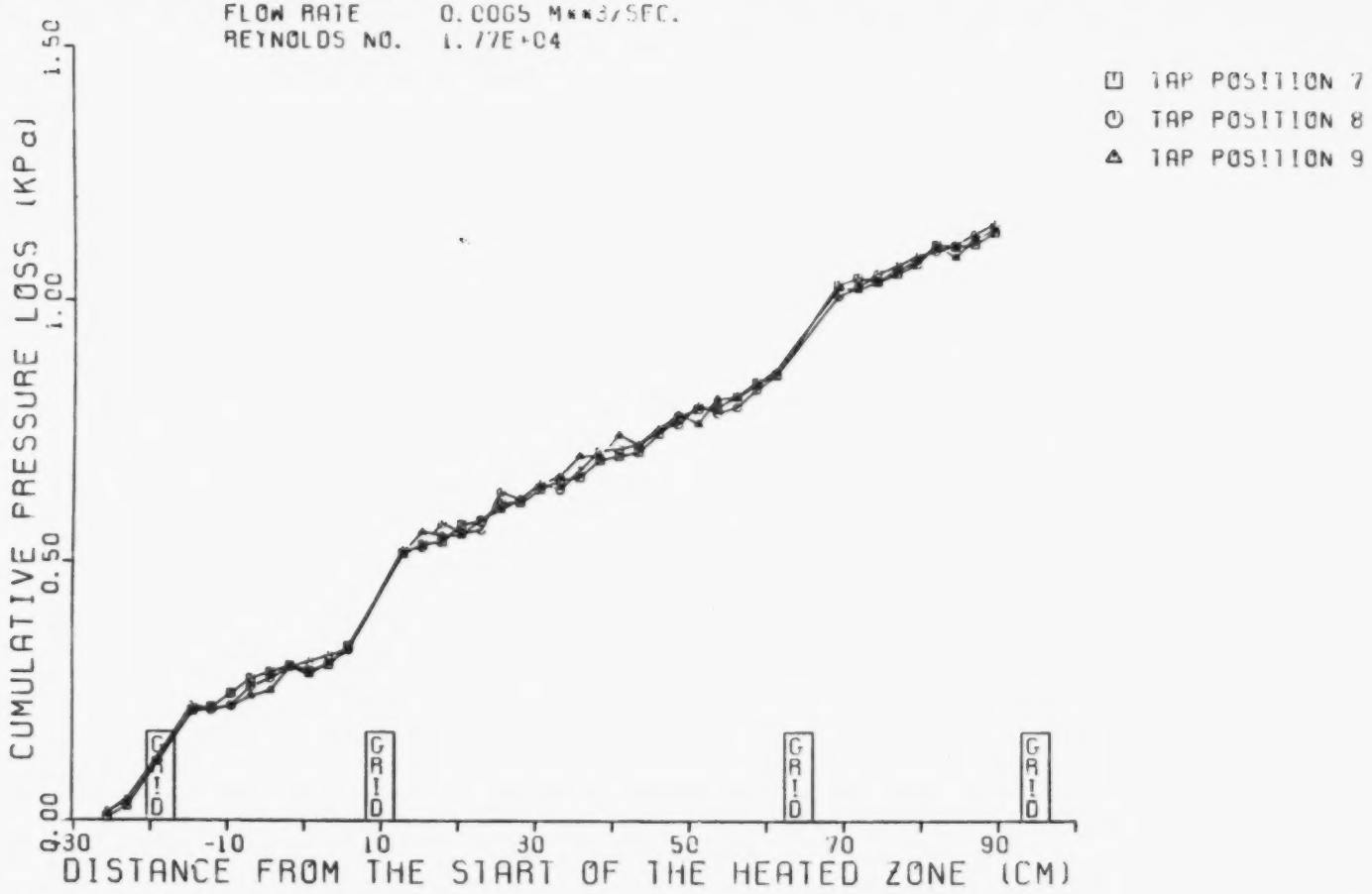


RUN NUMBER 19
BUNDLE B-5B
TEMPERATURE 50.4°C
FLOW RATE 0.0065 M**3/SEC.
REYNOLDS NO. 1.77E+04

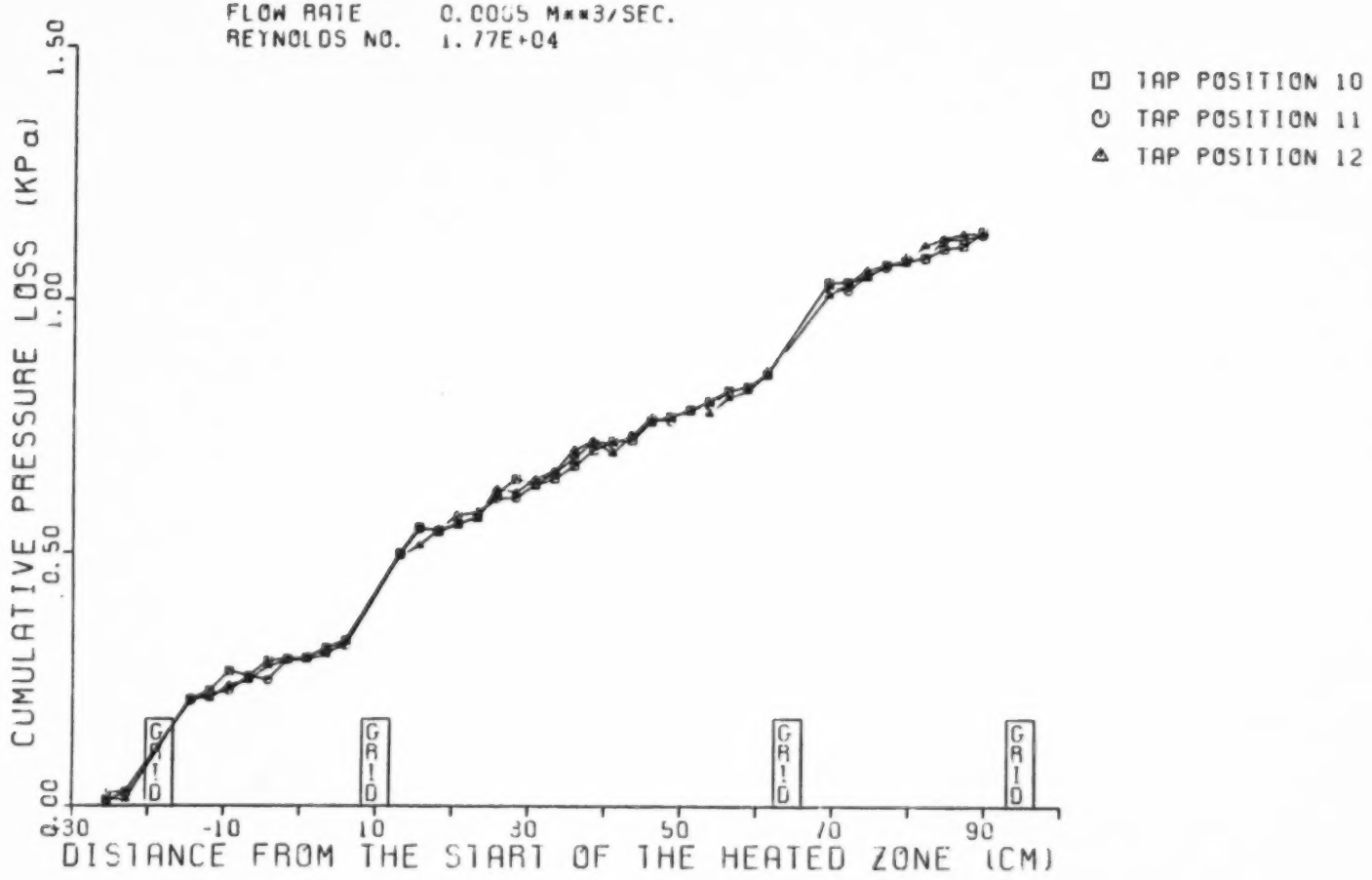


RUN NUMBER 19
BUNDLE B-5R
TEMPERATURE 50.4°C
FLOW RATE 0.0005 M**3/SEC.
REYNOLDS NO. 1.77E+04




RUN NUMBER 19
BUNDLE B-5R
TEMPERATURE 50.4 °C
FLOW RATE 0.0065 M**3/SEC.
REYNOLDS NO. 1.77E+04
TAP POSITION 7
TAP POSITION 8
TAP POSITION 9
CUMULATIVE PRESSURE LOSS (KPa)
0.00
0.50
1.00
1.50
GRID
GRID
GRID
GRID
-30
-10
10
30
50
70
90
DISTANCE FROM THE START OF THE HEATED ZONE (CM)

RUN NUMBER 13
BUNDLE B-5R
TEMPERATURE 50.4 °C
FLOW RATE 0.0005 M**3/SEC.
REYNOLDS NO. 1.77E+04



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